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FORSYTH COUNTY'S SOLID WASTE MANAGEMENT SYSTEM: A CASE STUDY

APPLIED MANAGEMENT SCIENCES, INC.

PREPARED FOR
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1973

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FORSYTH COUNTY'S
SOLID WASTE MANAGEMENT SYSTEM

A Case Study

This final report (SW-50c) describes work performed
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U.S. ENVIRONMENTAL PROTECTION AGENCY

1973

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FOREWORD

Solid waste management systems are an integral part of the environment of nearly every citizen in the United States. Yet until recent years, these systems have not received the attention other visible residential services have enjoyed. This historical neglect has resulted in systems which may not be cost-effective, especially with respect to the rising cost trends encountered in solid waste management activities. These trends arise from two principal factors:

* Environmentally sound disposal methodology is being enforced or strongly encouraged; as a result, disposal sites and needed equipment are now expensive to procure and operate; and,

* The collection function is highly labor intensive. Thus, the costs of unskilled labor, which have been rising to meet socio-economic demands, have had enormous impacts on local agency budgets.

This rise in cost pressure has forced all levels of governmental organizations to consider more closely the management and costs of solid waste management activities.

Because efforts to upgrade solid waste management practices are in their infancy, there is still an obvious lack of data bases for evaluative and comparative analyses. This case study is one in a series of case studies of solid waste management systems which has been conducted under the sponsorship of the Office of Solid Waste Management Programs, U. S. Environmental Protection Agency. Kenneth Shuster and Cindy McLaren served as EPA project officers on the case study reported herein. The purpose of these case studies is to fill in this data gap with actual case histories of how cities are handling their solid waste problems.

Concerned agencies at all government levels, as well as private firms, will be able to access information of the following types:

* The management and operating characteristics of public sector solid waste management systems.

* The institutional forces which give rise to these characteristics.

* Those techniques that have been or are being applied to enhance the measures of productivity, aesthetics, level of service, and environmental control.

These agencies and firms can then use these comparisons to upgrade their systems according to the norms achieved in other cities of similar size, geographical location, and operational and institutional characteristics.

--ARSEN J. DARNAY
Acting Deputy Assistant Administrator
for Solid Waste Management
Office of Solid Waste Management Programs

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1

INTRODUCTION

This report on the solid waste management system being operated in Forsyth County, North Carolina, has been prepared by Applied Management Sciences for the Office of Solid Waste Management Programs of the Environmental Protection Agency. This system consists of a loose confederation of franchised private sector collectors which has been organized under county management leadership to provide a higher level of service.

Prior to July 1, 1972, the collectors were in open competition for accounts. They would service any convenient customer, regardless of other collectors operating in the area. This arrangement resulted in a large degree of service overlap and, correspondingly, lower operating efficiences and higher costs. The county government noted this situation and proposed that the collectors organize to service assigned areas which were established on an equitable and mutually acceptable basis. The collectors, recognizing the utility of such an arrangement, readily embraced the proposal. The new system has been in operation since July 1, 1972, and it appears to be quite successful.

The site visit for this case study was performed using the following approach. Top county management was interviewed for information relating to current system operating characteristics in terms of historical and contemporary factors. Because private sector records are of a confidential nature, detailed operating characteristics for the collectors could not be obtained. However, the survey team did have the privilege to sit in on a meeting between county personnel and the collection firms. This opportunity provided a considerable amount of insight into the perspectives of the private sector, especially with respect to their problems and thoughts concerning possible solutions.

The structure of this report consists of five chapters, including the Introduction. Chapter 2 is a systems description abstract which synopsizes the characteristics of the county and its collection and disposal systems. Chapter 3 presents the findings of the case study effort and identifies potential problem areas. Chapter 4 describes the county in terms of those factors which impact its solid waste management operations. Chapter 5 deals with the dynamics of the system through its transition period. Where appropriate, the forces giving rise to particular events are presented as, for example, in the section discussing disposal methods.

Table 1 presents the titles of the people interviewed in Forsyth County, the dates of the interviews, and the types of information obtained.

TABLE 1

DATA SOURCES AND INFORMATION TYPES

Title	Date	Information Type
County Manager	22 Jan.	Basic System Characteristics and History
County Engineering Administrator	22 Jan.	System Evolution and Problems
Assistant County Manager	22 Jan.	Support Data
Environmental Planner for the Council of Governments	22 Jan.	Regional Plans and Efforts
Health Department Officer	22 Jan.	Private Dump and Litter Problems
Data Processing Director	22 Jan.	Disposal Analysis EDP
Private Sector Company Personnel	23 Jan.	Specific Disposal Approaches
Private Sector Meeting	23 Jan.	Problems and Proposed Solutions
Director of Public Works - City of Winston-Salem	24 Jan.	Perspective of City on Disposal

2

SYSTEMS DESCRIPTION ABSTRACT

County : Forsyth, North Carolina (Winston-Salem Area)

Contacts :		
	Nicholas M. Meiszer	County Manager
	Malchus Watlington	Assistant to County Manager
	Kenneth D. Hill	County Engineering Administrator
	Roger Schecter	Piedmont Triad Planning Associate (COG)
	Jim Dunn	Solid Waste Control Officer County Department of Health
	Sanders Mosely	Director of Data Processing
	Herb Brenner	Brenner Industries
	Arthur Kurtz	Chemwaste, Division of Brenner Industries
	oe H. Berrier	Director of Public Works, City of Winston-Salem
	Paschal W. (Pat) Swan	Assistant Director of Public Works, City of Winston-Salem
	Glen W. Kilday	Supt., Sanitation Division Department of Public Works City of Winston-Salem

Dates of Visit: January 22 through January 24, 1973

Population Demography:

Date	Total	White	Other
1970	81,435	79,025	2,410
1960	78,293	73,765	4,528
1950	N.A.	N.A.	N.A.

Area: 361 square miles (not including city of Winston-Salem

Density: 226 persons per square mile

Road Mileage: 1002 miles

Collection: 1/ Table 2

Miscellaneous: The collection operation is performed by a loose confederation of 14 private collection firms that have been assigned specific collection areas by the county. Currently, about 60 percent of the total number of households in the county have elected collection service. The remainder are permitted, by ordinance, to dispose of their own wastes according to prescribed health regulations.

Disposal: Table 3

Miscellaneous: The disposal operation is performed by the City of Winston-Salem for the county for a fee agreed to by both governments. According to a ten week disposal survey jointly administered in the summer of 1972, the county with 1/3 the population generates 1/8 of the solid waste going into these sites. Illigitimate disposal is widely practiced in the county and the Department of Health is taking steps to terminate this practice.

1/ Information available only for mixed refuse. Trash and larger items separately contracted for by residents, and no data are available.

TABLE 2

COLLECTION SYSTEM CHARACTERISTICS SUMMARY

Collection Function / Collection Variables	Mixed Refuse [1/]
Number of Routes	125 [2/]
Crew Size	2.2
Frequency of Service	1/week
Point of Collection	Anywhere on Customer's Property
Method of Collection	Carry-out and Curbside [3/]
Stops	15,042

1/ Performed at the date of the site visit by 14 private firms

2/ Assuming that 25 trucks service a different route on each day of a five-day workweek

3/ Many customers place their waste by the curb at the request of the collector

TABLE 2 (Continued)

Collection Function / Collection Variables	
Service Limitations	Will collect mixed refuse from two thirty gallon containers only
Incentive System	Not Applicable
Fund Source	Direct billing customers by collector
Tonnage (Annual)	14,530 4/
Wage Scales	Not available
Unions	None

4/ Projected estimate based on the City-County joint disposal survey

TABLE 2 (Continued)

Collection Function / Collection Variables	
Annual Cost	$631,764 5/
Comments	The five-day collection schedule is unlikely to be followed because of the small number of stops per truck per week.

5/ Based on minimum service fee to customers of $3.50 per month.

TABLE 3

DISPOSAL SYSTEM CHARACTERISTICS SUMMARY

Disposal Site / Disposal Variables	1	2	3
Type	Landfill	Landfill	Landfill
Disposal Rate 1/ (tons per day)	264	451	357
Expected Lifetime 2/ (years)	5	5	7
Operating costs 3/ (per year)	$68,640	$117,260	$92,820
Start-up costs	Not available	Not available	Not available
Location	Overdale Rd. (South)	Ebert Extension (South)	Smith Reynolds Airport (North)

1/ Based on ten-week survey assuming 400 pounds per cubic yard and a five-day week. The disposal rate is for the county plus the City of Winston-Salem. The county's share is about 12.3 percent.

2/ May be extended because of a recent land purchase by the City of Winston-Salem for landfill purposes.

3/ Based on a disposal cost estimate of $1.00 per ton and a 260-day year. This is in very good agreement with the budgeted costs totaling $275,000 for this fiscal year.

3

FINDINGS AND CONCLUSIONS
MAJOR PROBLEM AREAS

3.1 Findings

The major factor which precipitated the transition from open competition to the franchised collection system was disposal. The three principal facets of the disposal issue were: the rates charged to the county by the City of Winston-Salem for this service; a similar but less equitable problem with the Town of Kernersville; and, the proliferation of illegal dumps and vagrant waste found along county roadsides.

Upon investigation of various aspects of the disposal issue, county management found that the 14 collection firms were engaged in bitter competition in the more populous areas of the county and were not servicing the remainder. The county approached these firms and proposed that each be assigned specific collection areas on an equitable basis. The collectors agreed to the attractiveness of the proposal and entered into the franchise system on July 1, 1972. It would appear that three factors influenced their decision. First, the county assumed the role of an arbitrator and assured that no one company would be shortchanged. Second, the county passed an enabling ordinance for the establishment of the franchise system: without a permit, a private sector firm would be prohibited from collecting within Forsyth County. Third, by eliminating the cut-throat competition, the collection fee would rise somewhat and the operating expenses would be reduced.

One key to the success of the transition was its low impact on customers. The transition was completed with only a nominal number of citizen complaints,

most of which were for missed service. This form of complaint is to be expected when collection crews must learn new routes, especially if not all residents along these routes are customers. Essentially nothing was changed except, for some, a nominal fee increase. The level of service was maintained and all that changed was the collector. The system is now working well, the customers appear to be satisfied, and the county is working with the contractors to establish additional solid waste standards. Under these circumstances, negative public reaction was averted, at least for the present. However, as the confederation of the county and the collectors moves toward a more uniform level of service, which will initially prescribe the storage location of cans and may eventually require mandatory participation of all county residents, citizen resistance can be expected to rise.

The question of disposal site availability has been resolved for the present. Existing expected lifetime for the three facilities is a minimum of five years and acquisition of the fourth new site is expected to further extend this period. The success of the county clean-up plan being initiated by the Department of Health may decrease the expected lifetime of disposal sites.

3.2 Major Problem Areas

The major problems facing the county, other than the disposal rate problem which initiated the transition, were illegal disposal, widely varying levels of service, and roadside litter.

Historically, residents of rural areas were solely responsible for the disposal of their solid waste. This practice was quite acceptable when a landowner's property was sufficiently large to allow for a private dump and the quantitities and types of waste disposed were nominal and fairly well prescribed. In this age of urban sprawl and rising waste generation rates, such practices can no longer be performed in an environmentally sound and aesthetic manner. Unfortunately, old habits are hard to break, and many residents of semi-rural areas continue their past methods of disposal. What was worse, however, was the tendency of such residents to make somebody else's property their illegal dump site. The county is now taking steps to terminate such practices, using methods ranging from mild warning letters to litigation. The program is expected to succeed but the question of when has yet to be answered.

Of course, one alternative is the adoption of an ordinance requiring that all county residents subscribe to a collection service. The lack of an existent billing system and the probable public reaction are obstacles to this forseeable next step.

The collection system currently consists of a loose confederation of private companies, most of which are one and two truck operations. Additionally, the equipment utilized is generally quite old, is serviced by the owner, and is of relatively poor quality. The economies of scale and a fragmented market contribute to the financial circumstances which force utilization of second hand equipment or the lack of normal equipment replacement practices. It is apparent that the collection organization is far less efficient than it could be, principally because of a limited market and the number of active firms. Even if the market were to be expanded to include all of the county households, the total number of households involved would not appear to be sufficient to significantly increase individual collector productivity.

The basic transition was just the first of a series of phases through which the collection system is expected to pass. It is not yet stable and a hint of what the next steps will be has been observed. For instance, one contractor has bought out another so the number of collectors is now thirteen, rather than fourteen. Another collector has stated that when his equipment finally fails, he will quit the business. So, it is quite likely that within the next several years, either by purchase, merger or abandonment, the number of companies will be reduced. The lower limit is one company, but it is not probable that there would be fewer than three or four firms. It is possible that one of the larger private firms in the solid waste collection business may acquire the entire set of county contractors, but, given the condition of the equipment, such a firm would need the resources to replace much of the equipment. Until the county makes participation mandatory, the economies of servicing a small number of widely spread residences may keep the major firms from such an action.

The county will also pursue the goals of enhancing the appearance of its rural areas and treating the collectors on an equitable basis. Currently, some collectors provide backdoor service, while others have succeeded in getting

customers to set the refuse out at curbside. The most immediate change is the possibility that solid waste storage locations will be prescribed by the county. More remote but certainly foreseeable will be an ordinance requiring that all county residents subscribe to collection services. In addition to increasing the private collectors' revenues, the problem of rural dumpsites and vagrant waste will be solved. Centralized billing performed by the county may not occur for some time, as there is no complete billing list to which monthly charges could be added.

It is difficult to forecast the points in time when such events may occur. A mandatory collection system with prescribed solid waste storage and collection locations will tend to create more emotional and political reactions than the initial transition and may meet with considerable citizen resistance. However, with the franchise system now a reality and stronger state environmental statutes on the horizon, these evolutions are expected to occur.

4

BACKGROUND OF THE SYSTEM

Forsyth County was established in 1849 by the North Carolina Legislature when it divided Stokes County into two separate counties. The county lies in the northwestern quadrant of the state and encompasses an area of 419 square miles, including Winston-Salem, the county seat and the third largest city in the state. Winston-Salem was incorporated in 1913 from the separate towns of Winston and Salem. Forsyth County is part of the Standard Metropolitan Statistical Area which includes the cities of Greensboro and High Point, both in neighboring Guilford County. These two cities along with Winston-Salem are commonly referred to as the Piedmont Triangle. The total population of the county was estimated at 221,000 in 1972. Of this total, 62 percent or 137,000 people live within the corporate limits of Winston-Salem. The primary economic base for the county is manufacturing industries. The principal items produced are tobacco products, textiles, furniture, beer, electronic equipment, and machinery. In total, there are 225 diversified industries within the county.

The population of Forsyth County increased by 13.2 percent between 1960 and 1970. The majority of this growth occurred within the city limits of Winston-Salem, as the city's population growth represented 22,000 people out of the total county population growth of about 25,000.

4.1: Location, Geography, Demography, and Climate

Forsyth County stands a thousand feet above sea level in the rich tobacco lands of Northwestern North Carolina and is approximately 30 miles east of the Appalachian Mountain Range.

The 13.2 percent population growth rate of Forsyth County is comparable to the population growth rate of the United States during the past ten years but is higher than the 11.5 percent population growth of North Carolina. This substantial increase of population appears to have contributed significantly to the rapid economic development of the county. Retail sales and bank debits both have doubled in the past ten years. In addition, per capita income has shown continual growth during the past decade. Other indications of the economic growth of Forsyth County are shown in Table 4.

TABLE 4

ECONOMIC INDICATORS OF FORSYTH COUNTY'S GROWTH AND DEVELOPMENT

	1961	1971	Increase
Total Payroll	$ 369,321,365	$ 866,359,820	134.5%
Total Employment	82,365	108,580	31.8
Manufacturing Payroll	178,061,000	303,997,000	70.7
Manufacturing Employment	38,680	37,710	- 2.5
Retail Sales	316,305,026	694,429,802	119.5
Telephones	81,174	142,597	75.6
Electric Customers	70,596	92,578	31.1
Gas Meters	8,807	16,869	91.5
Water Meters	32,902	42,580	29.4
Postal Receipts	2,447,506	5,454,020	122.8
Bank Debits	3,687,111,000	14,203,286,000	285.2
Motor Vehicles	84,361	143,028	69.5

The non-white population of Forsyth County including Winston-Salem, according to the 1970 census, represents 22.3 percent of the county's total population. This percentage has decreased slightly as non-whites represented 24.2 percent of the population in 1960. The non-white population lives mainly within the 57.5 square miles of Winston-Salem. According to the 1970 census, the total non-white population in the county is 48,269 people, of which 45,859 (95%) live within the city limits.

Forsyth County's climate is described as moderate. The average monthly temperature ranges from 78.0° Fahrenheit in July to 40.7° Fahrenheit in January. There are approximately 34 days each year in which the temperature rises

above 90° Fahrenheit. This hot weather would not appear to create any special collection problems. The average relative humidity is 66 percent. Total annual precipitation in the county is 44.13 inches with snow and sleet accounting for 9.2 inches. Snowfall does create serious transportation problems for the residents and in turn for the garbage collectors. A four-inch snowfall, two weeks prior to the site visit, closed the county schools for a week because of dangerous roads. This event also disrupted the normal collection routine of the collectors.

4.2: Form of Government and Organization

4.2.1: Form of Government

Forsyth County has a five-man Board of Commissioners elected at large on a partisan basis. The County Manager is appointed by the Board in accordance with the County Manager Plan, authorized by the State General Assemply in 1927. The first full-time professional manager was appointed in 1961. County services are provided on a county-wide basis, excluding the two incorporated municipalities of Winston-Salem and Kernersville.

Both the City of Winston-Salem and the town of Kernersville operate with the Council-Manager form of government. Both municipalities have a Mayor, a Manager, and a Board of Aldermen, and they both provide additional city services. These two governmental units have taxing authority, but only within their city limits. Their tax rates are based on the valuations prescribed by the Board of County Commissioners and are in addition to the county taxes. The various tax rates are presented in Table 5.

TABLE 5

TAX RATE PER $100 ASSESSED VALUATION[1/]

MUNICIPALITY	RATE
Forsyth County	$ 1.49
City of Winston-Salem	1.55
Town of Kernersville	1.35
Rural Hall Sanitary District	.60
Walkertown Sanitary District	.50

1/ Assessed Valuation is based upon 58 percent of the appraised value.

Except for the Town of Kernersville, all the above taxes are collected by the Forsyth County Tax Collector. The Board of County Commissioners is the only tax levying authority on a county-wide basis.

4.2.2: Organization

An organization diagram of the Forsyth County Government is presented as Figure 1. As can be seen, the citizens of Forsyth County elect the Board of County Commissioners. The five Commissioners then appoint a County Manager to run the county's affairs. The first semi-circle around the County Manager corresponds to the line appointments in a normal organization chart. The County Manager appoints the people to run these primary departments and the secondary departments in the second semi-circle which are not starred. Supervision of the franchised collectors is administered by the Department of Engineering, Water and Sewers. The City of Winston-Salem and the county share the responsibility of appointing various other staff positions. The administration of these various agencies and the political body which appoints the members is illustrated in the final two semi-circles.

4.3: Agencies Impacting Forsyth County's Solid Waste Management System

There are three groups which have had recent impact upon the solid waste management system in Forsyth County. These groups operate at the state, regional, and local levels.

4.3.1: North Carolina State Board of Health

The North Carolina State Board of Health has examined the operations of all the landfills in Forsyth County. This regulatory organization ensures that the sanitary landfills are run in accordance with the North Carolina State operational requirements. For example, the State Board of Health inspected the new airport landfill site. This inspection consisted of checking the access roads, the hours of operation, the sub-surface soil, and many other aspects of the new landfill. The new site was approved after it was found that it conformed to all State regulations.

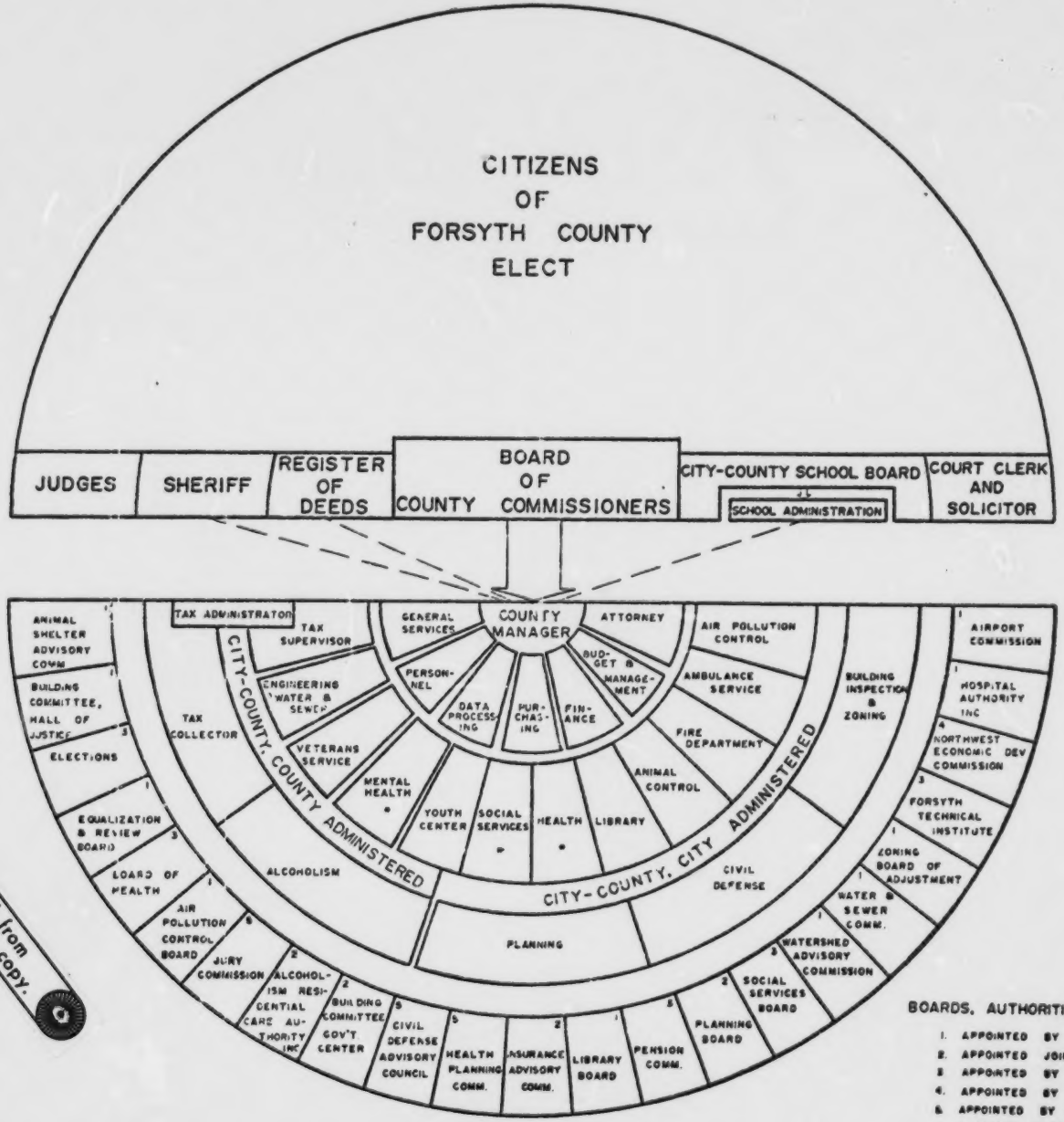

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FIGURE 1: ORGANIZATION OF FORSYTH COUNTY GOVERNMENT

4.3.2: Piedmont Triad Council of Governments

The Piedmont Triad Council of Governments is an eleven-county regional planning group. The two most populated of these members are Forsyth and Guilford counties. Part of the council's research effort is a study of the region's solid waste management problems. The first phase of this study was a nine month project which reviewed the regional solid waste disposal problems and the different opportunities for solution. The sanitary landfills and many open dumps within the region were identified along with the type and amount of wastes delivered to each site. These sites are shown in Figure 2. Based upon these initial estimates, the Council projected the disposal requirements for the region to the year 2000. A second phase of this study, which is currently being performed, is an attempt to refine and obtain more accurate estimates of these disposal requirements. In addition, it is scheduled that a regional solid waste management plan including disposal and transfer site locations, service charges for collection and disposal, and systematic procedures for both filing and collection of data will be devised.

4.3.3: The City of Winston-Salem

The City of Winston-Salem and Forsyth County currently share the disposal sites in Forsyth County. The city owns three of the four landfills and operates all three currently used sites. Forsyth County is planning to remit to the city approximately $45,000 a year for disposal privileges. The county and city operate separate collection systems. The city's system is municipally run, whereas the county has franchised the business to private haulers. The combination of these two systems does not appear to be probable in the foreseeable future.

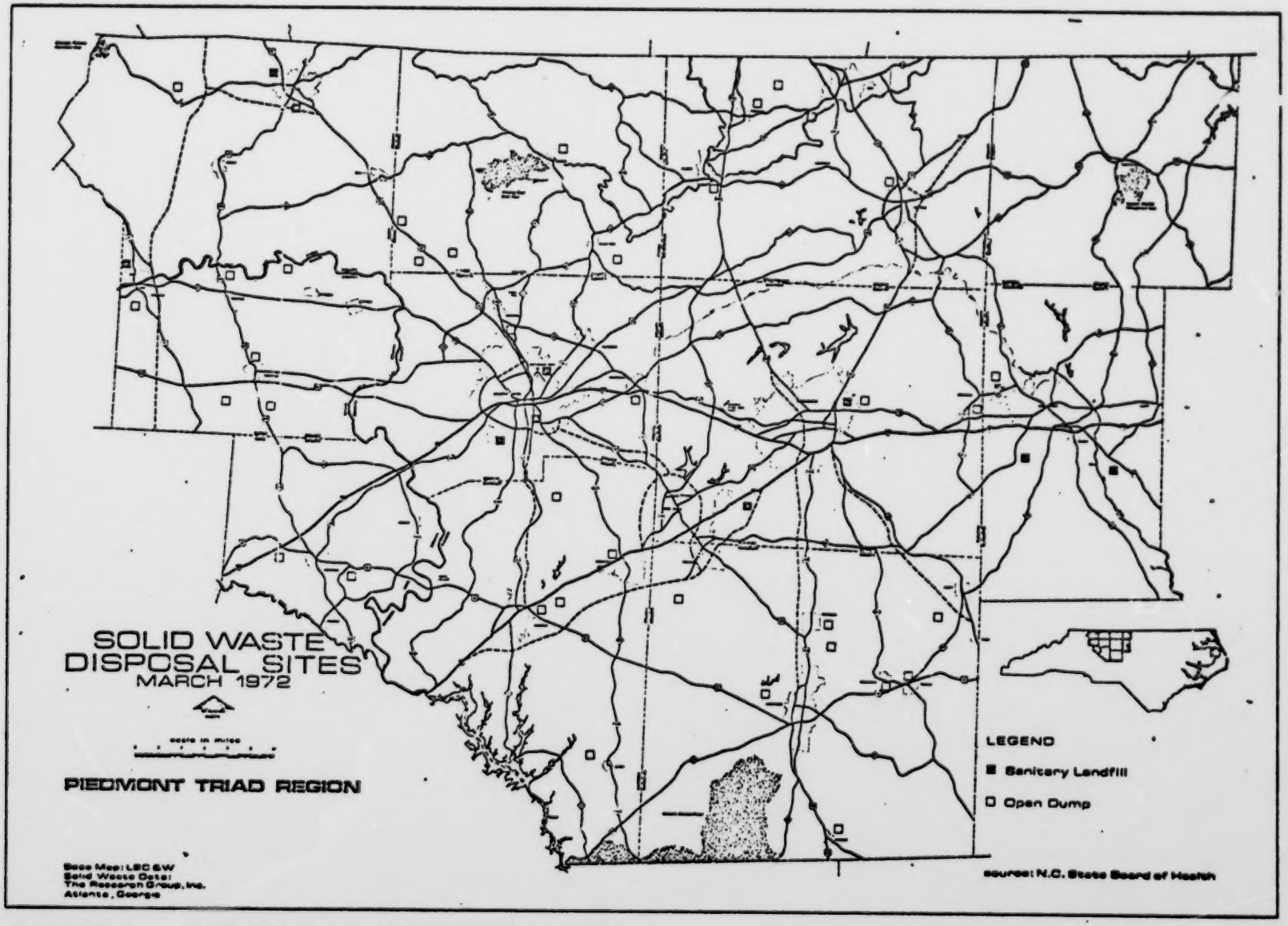

FIGURE 2: PIEDMONT TRIAD DISPOSAL SITES

5

SOLID WASTE SYSTEM CHARACTERISTICS

Forsyth County's solid waste management system is described in this chapter. Each aspect of the solid waste system will be addressed. Discussions focus on the development of the new system, level and quality of service, disposal methods, equipment operated by the private contractors, and financial aspects.

5.1: Description of the Forsyth County Franchised Collection System

5.1.1: Pre-Franchise Solid Waste System Characteristics

Prior to the approval of the ordinance adopting a franchised collection system, those residents of Forsyth County who elected to have their solid wastes removed by private haulers were served by one of the 14 collectors whose routes overlapped. In fact, some areas were served by several operators while others were not served at all. Collectors generally found it more profitable to provide service principally within the fairly well-developed suburban areas bordering Winston-Salem and Kernersville.

The solid waste collection system which existed in Forsyth County was not unlike the systems found in many other counties and political subdivisions which have both a rural and suburban population: The county did not provide refuse pick-up and disposal. In effect, a free enterprise system existed without any direct public sector controls. The county, which

covers slightly more than 360 square miles, excluding Winston-Salem, is sparsely populated. As a result almost 40 percent of the 26,000 homes in the county did not receive regular solid waste collection service because the homes were either too remote for economic collection by the private haulers or were served so poorly that residents elected to dispose of their own mixed refuse. In some cases, homeowners were placed at the mercy of trash haulers: irregular service and missed collections were commonplace. In addition, there was no established rate: rates were negotiated between the homeowners and each private sector collector.

Any householder or business outside of the county's municipalities which desired collection service was required to contract with one of the county's private haulers concerning frequency of pick-ups, type and quantity of waste materials to be accepted, and the monthly fee for the service. Charges varied from $2.50 to $6.00 per month for weekly service, and different haulers set different limits on the number and weight of cans which were collected for the basic fee.

The county placed no restrictions on fees charged or minimum service rendered. As a matter of fact, the only requirements set by the county were related to health and safety. All private refuse haulers were licensed by the Forsyth County Health Department and were required to have their equipment inspected annually. In order to obtain a license renewal, the Health Department required that each operator show a definite need for his services by county residents and possess liability insurance covering property damage.

Solid waste problems were compounded by the fact that several of the collectors operated in more than one county. Frequently, private haulers would dispose of solid wastes collected in other counties, free of charge, at the landfills in Forsyth County. There were other complicating factors. For example, one company collected wastes only from commercial and industrial establishments, while others collected residential refuse as well as refuse from small businesses, churches, etc. Some of these picked up trash but not garbage.

Heads of households and owners of businesses, who either by choice or necessity had to dispose of their own refuse, were required to do so in a safe and sanitary manner approved by the Health Department. They were not, however, allowed to use the disposal sites in Forsyth County operated by the City of Winston-Salem.[1/] City operated sites were reserved for the disposal of city waste only.

Additional problems were created by storage regulations. The Forsyth County Health Department required that all garbage be stored in approved covered containers while awaiting collection and disposal. Before implementation of the franchise collection system, effective enforcement of the storage requirement was difficult.

All of the above conditions combined to result in a comparatively inefficient and low quality system. Illegal dumps existed everywhere, and both residents and haulers were adding wastes to them. The dimensions of the vagrant waste and roadside litter problem, resulting from poor collection service and violations by both homeowners and haulers alike, finally reached proportions which necessitated that officials of Forsyth County take a more active, regulatory role in the collection of solid wastes.

Problems which existed in the unincorporated areas of Forsyth County under the old solid waste management system were identified by the combined City-County Planning Board (Forsyth County and Winston-Salem, North Carolina) and were published in a report in the spring of 1971 (Table 6). It was found that the collectors themselves favored efforts made by county officials to modify the free-enterprise system in favor of a more manageable and efficient franchised collection system whereby the county would exercise some control and regulate, to some extent, the solid waste collection in the unincorporated areas.

1/ Solid Wastes Management: Winston-Salem/Kernersville/Forsyth County, City-County Planning Board, Spring, 1971, page 12.

TABLE 6

PROBLEMS IN THE UNINCORPORATED AREAS OF FORSYTH COUNTY - SPRING 1971

- The most obvious problems are the non-existent or incomplete pick-up service in some areas and overlapping service in others, as trash collection in Forsyth County is not franchised. Hence there is inefficient and costly duplication of routes.
- State regulations now prohibit open burning. This outlaws the principal disposal method customarily used by many businesses and households not served by private trash collectors.
- Many valid complaints that reach the Department of Health concern roadside dumping of trash. Roadside dumping is a form of visual blight and probably provides harborage for rats and a breeding place for other pests, but regulations against this practice are difficult to enforce since an eyewitness must be able to identify the guilty person in court.
- Outside municipalities there is no provision for the collection of dead animals. The Highway Department will pick up animals killed on highways, but private citizens must pay a Greensboro processing company to dispose of small animals or must take them to the city landfills to bury them. The processing company will pick up large animals only.
- The private collectors themselves face certain problems. Some people do not fulfill their responsibility for proper storage of refuse. They do not keep containers covered, or they may throw in rocks or other heavy materials. These practices make the containers difficult to lift.
- Private haulers have difficulty in collecting payment for services.
- There are some labor problems. Since the small private haulers cannot afford to pay high wages, they find it hard to recruit efficient workers. They also cannot compete with better capitalized and equipped operators.
- Annexation by Winston-Salem is a continuing threat to the most lucrative portions of private haulers' routes. Sometimes annexation may take half of a collector's business when the residences annexed begin receiving city collection services.
- Problems occur when the private hauler operates his own landfill. There is often unauthorized dumping in his fill; and the application of earth cover is usually not adequate to protect against rodents, flies, and other pests and other obnoxious odor.
- If and when Winston-Salem converts to the baler system with which it is now experimenting, the loose trash collected from households by private haulers in Forsyth County and deposited in the city's fills would not be compatible with the city's baled material.

As a result of the recommendations made by the combined City-County Planning Board, Forsyth County and the City of Winston-Salem entered into discussions concerning the proper charges for the disposal of solid waste originating from outside the city limits in the city-operated landfills. These preliminary meetings were held primarily to correct existing solid waste disposal problems. However, they also set the stage for the development of the franchised collection system which became effective July 1, 1972.

5.1.2: Steps Taken by Forsyth County to Implement Its Franchise Collection System

The reasons behind the adoption of a franchised collection system in Forsyth County are obvious. First and foremost, the new system provided the county with some measure of control over the solid waste collection practices of the private haulers. In addition, the new system provides a vehicle by which the county can set standards, make inspections, and monitor the quality and regularity of collection and disposal operations. Major secondary benefits of the franchised system are that the county was able to implement a new solid waste management system which had no initial capital outlay requirements and which allowed all existing collectors to remain in business if they chose to operate an exculsive franchise.

The establishment of the new franchise collection system and the final approval of the franchise applications were not made overnight. From the time that city and county officials first met to discuss county takeover of the city-operated Airport landfill (and the subsequent implementation of the new franchise system), almost one year passed. County officials cite 15 major events which have occurred since the new solid waste management system was first proposed (Table 7).

TABLE 7

CHRONOLOGY OF EVENTS LEADING TO A FRANCHISED COLLECTION SYSTEM IN FORSYTH COUNTY

- Meeting with the City of Winson-Salem on October 1, 1971.
- Request to begin Landfill Operations on November 9, 1971.
- Public meeting held with private trash collectors November 8, 1971, and November 22, 1971.
- Airport Landfill Site Investigation Request made on December 29, 1971.
- Landfill operational approval requested from the North Carolina State Board of Health on April 11, 1972.
- Approved ordinance zoning the solid waste management program for Forsyth on April 10, 1972.
- Closing of dumps within the county between April 25, 1972, and May 9, 1972.
- Meeting with private trash collectors June 6, 1972.
- Approval of franchise applications on June 23, 1972.
- Questions discussed by letter dated August 8, 1972.
- A report of the Landfill survey performed by Forsyth County and the City of Winston-Salem, was published September 25, 1972.
- Scheduled meeting with franchised collectors on November 15, 1972.
- Request for approval of rate adjustment on January 2, 1973.
- Sale of franchised area on January 17, 1973.
- Six-month evaluation meeting scheduled for January 23, 1973.*

* Attended by site visit team.

Meeting Between Winston-Salem and Forsyth County Officials Concerning Landfill Operations

On October 1, 1971, an agreement was reached between city and county officials whereby the county would manage a landfill which would be operated by a private company.

Landfill operations would be located adjacent to the municipal airport, and provisions were made for a second landfill site in the northern part of the county. The essential points agreed upon at the meeting were:

- Residents of Forsyth County using private vehicles may dispose of solid waste free of charge at any landfill site.
- County franchised and contract vehicles that collect county solid waste are restricted to the county-managed landfill, or they must pay a service charge to use landfill sites managed by the city.[1/]
- City collection vehicles are allowed to use the county managed landfill free of charge.
- Industries which use their own vehicles to haul their solid wastes may use the city-managed landfill free of charge. Industries using the county-managed landfill are charged $ .55 per cubic yard.
- A separate area in the northern part of the county is to be used as a landfill site for brush and debris.

Request to Begin Landfill Operations

After a preliminary approval to manage a sanitary landfill was granted on November 1, 1971, a formal request was made by Forsyth County's Engineering Administrator to the Board of County Commissioners to begin operation of a landfill near the airport. A rate structure for collection service under a new franchised collection system was proposed, and a decision was made requiring the private contractor who operates the landfill for the county to post a $25,000 performance bond. Two important elements of the county's solid waste policy appear in the formal request:

1/ Contracted vehicles are those hired by the county for special waste removal activities. Special waste would include, for example, demolition wastes resulting from county government efforts.

- The county will provide a solution to the solid waste problem without use of tax funds
- The county officials will take a strong management position with the private franchised companies supplying the capital investment, the people, and the equipment.

The disposal agreement with the private contractor was never concluded because the City of Winston-Salem felt that the rates were higher than would be charged by the city.

Public Meetings With Private Trash Collectors

County commissioners met with all licensed solid waste collectors who were interested in participating in the proposed franchise collection system in early November of 1971. Discussions focused on the problems of equitable rates for services rendered as well as the issue of quality of service and performance monitoring.

Request for Airport Landfill Site Investigation

Before operations could begin at the airport landfill, representatives of the North Carolina State Board of Health were required to visit the site and approve all health and safety aspects of the operation. Among the items under consideration were sub-surface soil composition, metes and bounds, property description (including topological maps and aerial photographs), specifications for a drainage system, and precautionary measures to prevent seepage. Following the site visit made by officials from the Board of Health, the county requested final approval of the airport landfill operation. The city commenced landfill operations shortly thereafter.

Approval of the Zoning Ordinance Needed to Implement the Solid Waste Management Program for Forsyth County

On April 13, 1972, the Forsyth County Engineering Administrator announced to all licensed solid waste collectors that the county commissioners had approved a zoning ordinance which would govern the management, collection, transportation, and disposal of solid waste in Forsyth County (Appendix A). Of particular interest to the private haulers was Section 8 of the Ordinance, which outlined the procedures necessary to obtain an exclusive franchise for a specified sector of the county. An announcement was made that franchise

application forms and necessary instructions for preparing those forms were available from the County Manager's office. Following this announcement and in anticipation of the introduction of the new solid waste management system, the county closed all privately owned dumps by June of 1972.

Meeting with Private Trash Collectors

County officials met with the collectors to discuss the areas which were to be franchised on June 6, 1972. Area designations were made based upon collectors' requests and their previous ability to perform the service, as defined by the number of stops they serviced and the general quality of services they provided. The meeting was also held to discuss any additional problems which might develop after the introduction of the new franchise collection system.

Approval of Franchise Applications

Following passage of the ordinance which allowed the county to grant franchises for collection and transportation of solid wastes on June 19, 1972 (Appendix B), all collectors whose franchise applications had been approved by the Board of County Commissioners were notified. Included in the notification were the following:

- The price ceiling for residential collection was set at $3.50 per month for two standard 30-gallon garbage containers with fly-tight covers.
- Franchised collectors may negotiate fees for additional containers, special services, and collection of bulky articles.
- All negotiated fees must be agreed upon between the parties concerned and are subject to the approval of the Board of County Commissioners.

Definition of a "Standard Garbage Can"

Initial operation of the new franchised collection system proceeded without incident except for questions raised by several collectors and homeowners concerning proper storage containers and rate structure. As a result, the County's Engineering Administrator prepared a form letter which was sent to all individuals who raised questions on these two points.

Landfill Survey -- Solid Waste Study

In order to develop a suitable formula for future solid waste disposal cost sharing, officials from Forsyth County and the City of Winston-Salem performed a ten-week study analyzing the operational costs and the composition (source and content) of solid wastes disposed at the county landfills. Their report was published September 25, 1972.

Meeting With Franchised Collectors

County officials met with the collectors to assess the performance of the franchised operators during the first four months of the new system. Suggestions were solicited as to better ways to encourage more county residents to take collection service. Also, an announcement was made of a six-month report on the progress and current status of the new solid waste system which was to be prepared by the County's Engineering Administrator.

Requests for Approval of Rate Adjustments

After holding discussions with collectors and surveying county residents, county officials suggested a rate adjustment to the County Manager. The proposed monthly service charges would be:

- $3.00 for curbside collection
- $4.00 for collection at the rear of the house, not more than 150 feet from the road
- $5.00 for collection at the rear of the house, more than 150 feet from the road.

Sale of a Franchised Company

On January 17, 1973, the County's Engineering Administrator recommended to the County Manager that the transfer of any of the existing franchises be approved. One of the franchised collectors purchased outright the assets of another franchised operator and the franchised areas of the two collectors were contiguous. The Board of County Commissioners has approved the transfer.

Six-Month Evaluation Meeting

County officials have recognized the need for open dialogue with and continuous feedback from the private haulers in order to make the franchise collection system work. As a result, a meeting was held on January 23, 1973, with the franchised collectors to evaluate the first six months of operations. Topics covered included:

- Area adjustments
- Routing/scheduling procedures
- Inequities between residences served
- Location of garbage containers
- Quality of service
- Rate structure
- Curb collection incentives

5.1.3: Present Status of the Franchise Collection System

In general, the county's new franchised collection system has met with approval from both collectors and residents. On occasion, the county has had difficulty getting residents to accept the new system. Most residents who objected were those who were receiving service from a different operator and who had experienced good service (in some cases, at a lower rate) from the original collector. All in all, there have been few problems resulting from the new system's implementation. Surveys conducted by the county indicate that customers are satisfied with service, but the majority do not want collection restricted to curbside.

There are continuing specific problems which county officials have identified and are now in the process of eliminating. For example, although quality of service has improved and "no pick-up" complaints have decreased, there is considerable room for improvement. Weather is a more critical parameter than it should be for an efficient collection operation. Recently, several collection days were missed because of excessive rain. The operating equipment of some collectors is in poor condition, and only two operators have reserve equipment. As a result, the system is extremely vulnerable to mechanical failures. Another problem, albeit temporary, has been the inability of some

collectors to arrive at the optimum, or near optimum, routes and schedules for their franchised area.

Major System Benefits

The basic advantages of the new system are outlined by the county in its report Solid Waste Management With a Franchised Collection System:

> "Forsyth County provides the management to set standards and to insure that the collection, transportation and disposal of solid waste is done in a satisfactory manner. Vehicles and containers used for the collection and transportation of garbage or refuse are kept covered and are inspected for durability and ease of cleaning. The vehicles used for the transportation are moved in such a manner as not to leak or spill. If spillage should occur, the collector will pick-up all material immediately. Franchised collectors must renew their franchise application yearly and must have a permit from the Health Department. This procedure allows county representatives to know the operators and equipment utilized. Records are kept indicating the number of trucks, type of trucks, number of personnel, and the activity and efficiency of each collector. Routes are discussed and we know the people within the area that have contracted for service and those that have not subscribed for collection."

Quite obviously, the franchised collection system provides more checks and balances and a greater performance monitoring capability than the previous system of unregulated competition. Although plans have been made to conduct surveys in 1973 to determine how residents who do not subscribe to the service dispose of their solid wastes, county officials hope that eventually all residents will voluntarily request solid waste collection service. In all likelihood, more residents will subscribe once the county puts teeth into the enforcement of the state law which prohibits open dumping. Violation of the law is a misdemeanor, and conviction can result in a fine of up to $50.00 or 30 days in jail. The first criminal charges were brought against one county resident in mid-January of 1973.

5.2: Level of Service

At this time, the basic service offered to residents of Forsyth County is two can carry-out once each week for which a monthly fee of $3.50 is paid by the customer to the franchised collector. Additional service may be negotiated between the two parties, and it is approximately $1.00 for each additional can.

The level of service of collection was established by an ordinance dated June 19, 1972 (Appendix B) which was a supplement to the enabling county ordinance passed on April 10, 1972 (Appendix A). The section discussing the level of service and the basic fee presents the following statement:

> "...maximum collection and transportation fee or charge for residential service (meaning one per week pickup of stored solid waste, not exceeding two containers or cans, each of a capacity of thirty gallons or less) of three dollars and fifty cents ($3.50) per household per month. Fees or charges for additional or special services other than as specified herein may be agreed upon by the parties, subject to County review and approval..."

County ordinances cover only mixed household solid waste: other waste types such as bulky articles and yard waste are the responsibility of the homeowner. The homeowner may negotiate the removal of such wastes with the contractor on a fee for-service basis.

Of significance is the fact that homeowners currently have the option to accept service: those who elect to dispose of their own waste can do so, providing the methodology utilized is in a "manner approved and authorized by applicable health regulations." The ramifications of this situation is presented in more detail in section 5.4, which discusses disposal methods.

Because Forsyth County is principally rural, it is said that collection is performed for homes which are widely scattered. This situation tends to

generate low collection efficiencies as well as high operating costs for the operators. This problem of low linear dwelling unit density (the number of dwellings per road-mile) may be overstated, since the county is probably characterized by high density pockets with low density distances between them. In fact, data supplied by Forsyth County planners indicates that the total collectable road mileage in the area is 1002 miles (excluding Winston-Salem and interstate only). At this time, the number of private sector trucks operating in the county is about 25 so the maximum average route length per day[1/] is only eight miles. This is not excessive and, in fact, may be smaller than the national average.

An additional problem is that the solid waste storage location has not been prescribed: consequently, many collectors must carry waste from the rear of their customer's property. At the six month meeting, documentary evidence was presented to show that this distance can be as much as four hundred feet. In such instances, the level of service is far in excess of the fee. Current discussions among county management and the private collectors include this issue. The collectors do not yet hold common opinions: some would like to perform curbside-service while others would prefer to adjust the fees to reflect the level of service. Still others would like the county to prescribe the storage location adjacent to the rear of the premises. The results of a survey performed on January 5, 1973, Table 8, presents the viewpoints of the collectors currently serving the county. The diversity of the opinions is apparent but seem to be divided between curb or near curb and behind the house. This question on level of service will be resolved when either the collectors agree on some common system or the county imposes a solution, or a combination of the two.

For the most part, the current fee schedule reflects the level of service provided to the residents of Forsyth County. In densely populated

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[1/] Assuming a five day waste week which is greater than what is actually practiced.

TABLE 8

COLLECTOR PREFERENCE FOR LEVEL OF SERVICE

COLLECTOR	
1	50 to 75 feet from road.
2	Curb - 1/3 less labor - 1/3 day saved - Price adjustment $3.00/curb - $5.00/behind house.
3	Wherever convenient for the customer.
4	On side of the road. Most (95%) are behind the house. Would save 70% of time.
5	Wherever they have them. Does not want to tell a person where to put the cans. (Closer to the road if possible.)
6	At the curb - Would cut time in half. Back of house; not back of lot. Would not miss a day if on the curb even on rainy days.
7	Curb or be able to back truck to the cans.
8	Cans should be left next to the road.
9	Right behind house - Most are at end of lot or at curb of road.
10	Behind the house.
11	Keep just as it is.
12	Curb - 1/3 time would be saved.
13	30 feet from the road or at the curb.
14	Unable to reach him.

areas, the fee is somewhat high for the once-per-week collection frequency, but this condition is probably balanced by the efforts required for more rural areas. This balance will shift as more residents of rural areas become customers of the franchised collectors, either by choice or by ordinance.

5.3: Productivity and Quality of Service

Crew productivity of the franchised collectors cannot be determined with any high degree of accuracy because of insufficiently developed data. However, Table 9 has been prepared using the best data available and includes the assumptions leading to the figures presented. Collection cost data is not provided inasmuch as such information is of a confidential nature to all private sector firms. Instead, the minimum fee of $3.50 per month per dwelling unit is used for these calculations.

What is immediately apparent are the low values for most measures of efficiency. The average truck efficiency is only 120 stops per truck per day, whereas the maximum achieved is 198 stops per truck per day. Correspondingly, the average daily collection is 2.2 tons with a maximum value of 3.9. These figures are significantly lower than data for suburban or urban areas.

There are contributing factors that give rise to these low productivities. First, there is the very low linear dwelling density of 12.8 dwelling units per curb-mile.[1/] This indicates that dwelling units are an average of 410 feet apart and such a condition is not conducive to high collection efficiencies. The second factor is that there are a large number of collectors for a relatively small market. It should be noted that if every household in the county elected to thave its solid waste collected, the addition of 10,654 customers would raise the average truck efficienty to 206 stops per truck per day. These figures are based on a five day collection week which is not expected to be practiced. Thus, even the efficiency levels for total residential collection would be low.

1/ Calculation based on 2004 curb miles and a dwelling unit count of 25,696 as provided by the 1970 census.

TABLE 9: EFFICIENCY/PRODUCTIVITY DATA FOR FORSYTH COUNTY'S SOLID WASTE SYSTEM

	Collection Function / Parameter	1	2	3	4	5	6	7	8	9	10	11	12	13	14	TOTAL
Community Description	Population Served	46,630														
	No. of Resid. or Comm. Units	5500	1783	475	815	275	990	775	1847	600	475	232	275	575	425	15,042
	Street Miles	1002 street miles in the entire county														
	Alley Miles	N.A.														
	Area (sq. mi.)	361 square miles														
	Pop. density (peo/sq.mi.)	226 people per square mile														
Waste Amounts	Annual Amounts Collected	8142	1503	411	19*	5*	772	939	28*	707	529	458	280	734	N.A.	14,530
	Lbs./unit/wk	57	32	33	—	—	30	47	—	45	43	76	39	49	—	37
	Lbs./person/day	2.63	1.47	1.52	—	—	1.38	2.17	—	2.1	1.98	3.5	1.8	2.26	—	1.71
Collection System Description (inc. Level of Service)	Point of Collection	wherever stored														
	Freq. of Collection	once per week														
	Type of Storage Container	Two 30 gallon containers maximum														
	Ave. Dist. to Disp. Site	N.A.														
	Avg. Miles Driven/truck/day	N.A.														
	Avg. Hours worked/day	N.A.														
	Direct men	21	4	1.5	4	3	2	1.5	5	3.5	1.5	1.5	1	3	3	55.5
	Crews	8	2	1	2	1	1	1	2	1	1	1	1	1	2	25
	Crew Size (average)	2.6	2	1.5	2	3	2	1.5	2.5	3.5	1.5	1.5	1	3	1.5	2.2
	Trucks	8	2	1	2	1 1	1	1	2	1	1	1	1	1	2	25
Wages	Ave. wages and fringe for laborers	N.A.														
	Ave. wages and fringe for drivers	N.A.														
Collection Cost/Efficiency Figs.	Stops/Crew/Day	137	178	95	82	55	198	155	184	120	95	46	55	115	43	120
	Tons/Crew/Day	3.9	2.9	1.6	—	—	3.0	3.6	—	2.7	2.0	1.8	1.1	2.8	—	2.2
	Coll. Cost/resid. unit/yr.	$42.00														
	Coll. Cost/person/yr.	$13.55														
	Coll. Cost/ton/yr.	$43.48														
	Total Coll. Cost/yr.	$631,764														
Disposal	Type & No. of Disp. Sites	Three Landfill Sites														
	Total Disp. Cost/yr.	$45,000 per year														
Total Cost	Total Cost/yr.	$676,764														
Misc. Cost Ratios	Coll. Expense as % of tot. Exp.	93.4%														
	Coll. labor expense as % of tot. Coll.	N.A.														
	Coll. equip. expense as % of tot. Coll.	N.A.														
	Proc. & Disp. expense as % of tot. exp.	6.6%														
	Proc. & Disp. labor expense as % of tot. disp.	N.A.														

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* Contractor was using disposal sites other than the city-operated landfills.

TABLE 9 (Continued)

ASSUMPTIONS AND OBSERVATIONS FOR
THE CALCULATIONS PERFORMED

1. The disposal survey was performed for the time interval between June 11, 1972 and August 19, 1972.

   a. The franchising system was implemented on July 1, 1972. The customer allocation is the average of the customers before and after the transition.

   b. The tonnage values reported may be higher than the annual average due to the seasonality of waste generation rates.

   c. The annual amounts collected are in error for some of the franchised companies because the data reports disposal rates at the city/county sites. Some companies were using other disposal sites more convenient to their operation.

   d. The total amount collected of 14,530 tons is considerably smaller than the sum of the disposal rates reported in Table 3 (when adjusted to the county share at 12.3 percent). This factor arises because there is a large company that collects county commercial customers only but contributes to the county waste disposal requirements.

2. The number of road miles was provided by Forsyth County.

3. The number of occupants per dwelling unit were taken as 3.1 which corresponds with data found in the 1970 census tracts for Forsyth County.

4. All data providing company characteristics was taken from franchise applications. The number of direct men may include the owner. The number of trucks include all types as discussed in Section 5.5.

5. A route was taken as one day's activities and a normal five day work-week is assumed.

6. The collection cost information is based on the minimum collection fee and does not include additional service.

7. The disposal cost information is based on the current proposal before the county government from the city of Winston-Salem.

Also of interest is the low solid waste generation rates that are associated with county residents. This factor contributes to the low daily truck tonnage. The mixed residential waste that can be contained by two thirty gallon cans is about 60 pounds, assuming an uncompacted density of 200 pounds per cubic yard. As the figures indicate, in all but one case the weight collected is less than the calculated capacity. The low residential generation rate is not particularly surprising as similar values have been found in other rural communities.

The quality of service appears to be reasonably high. Little is known of the situation before the transition to the franchise system. The transition itself did have some rough spots and the complaint frequency at that time was fairly high, principally due to the fact that new routes had to be learned by collection personnel. This problem was complicated because routes do not necessarily include all the residents along the road. The principal complaint was missed service and one company in particular was singled out as being troublesome. The contributing factor in this case was a series of mechanical problems with the collection vehicle and the lack of a stand-by truck. Events of this kind cannot be forecast and just happened to occur following the transition.

The Forsyth County government has been especially sensitive to citizen complaints and significant efforts have been undertaken to assess acceptance of the new system. In early January of 1973, a customer survey was undertaken to determine customer satisfaction with a specific collector. With few exceptions, all of those who responded were satisfied with the new collector. This positive reaction has been found to be the general rule for all of the transplanted companies. The survey also asked if the respondent desired curbside collection for a smaller fee than that for carry-out. The respondents were generally not in favor of this proposal.

5.4: Disposal Methods Practiced in Forsyth County

There are currently two distinct methods for the land disposal of solid wastes generated within Forsyth County: those which are environmentally

sound and are designated as "legal"; and, those which are not. The legitimate public sector disposal is performed by Winston-Salem city personnel on city and county land. Additionally, private sector collectors are permitted to use their own disposal sites providing that the methodology practiced is environmentally sound. Private citizens are also allowed this choice. However, all of these site operators must obtain a disposal permit from the Forsyth County Department of Health.

It is clear that many Forsyth County residents, generally outside of the Winston-Salem city limits, have chosen to discard their wastes as they choose. Consequently, there are a large number of roadside dumps in addition to a clearly visible amount of general roadside litter. Within the past year, the Forsyth County Department of Health has initiated a surveillance and enforcement program to locate, identify, and force owners of private dumps to terminate operations and eliminate the dump condition. (Appendix C presents enforcement literature.) By the 24th of January of 1973, the Health Department had located 195 of these sites and, of these, approximately 35 percent have been cleaned up. Similarly, the county initiated its first lawsuit against a site owner who did not comply with the dumping ordinance. This event is expected to encourage other owners to speed cleanup.

The litter laws are also being enforced when possible. This is being done by the unpleasant task of sorting through discarded refuse for some form of identification such as a letter envelope or subscription magazine. A "find" precipitates a letter, also presented in Appendix C, to the addressee to remind him of the dumping ordinance and to familiarize him with the penalties for malfeasance. There is yet no estimate of success of this policy.

The legitimate disposal activities are operated by the City of Winston-Salem at three existing landfill sites, one of which is owned by the county at the airport. Figure 3 illustrates the location of these sites. A fourth site has been purchased by the city and will start operations in the near future.

A fee system has been initiated for all users and this, in particular, affects the county. Current disposal fees are based on disposal site use and

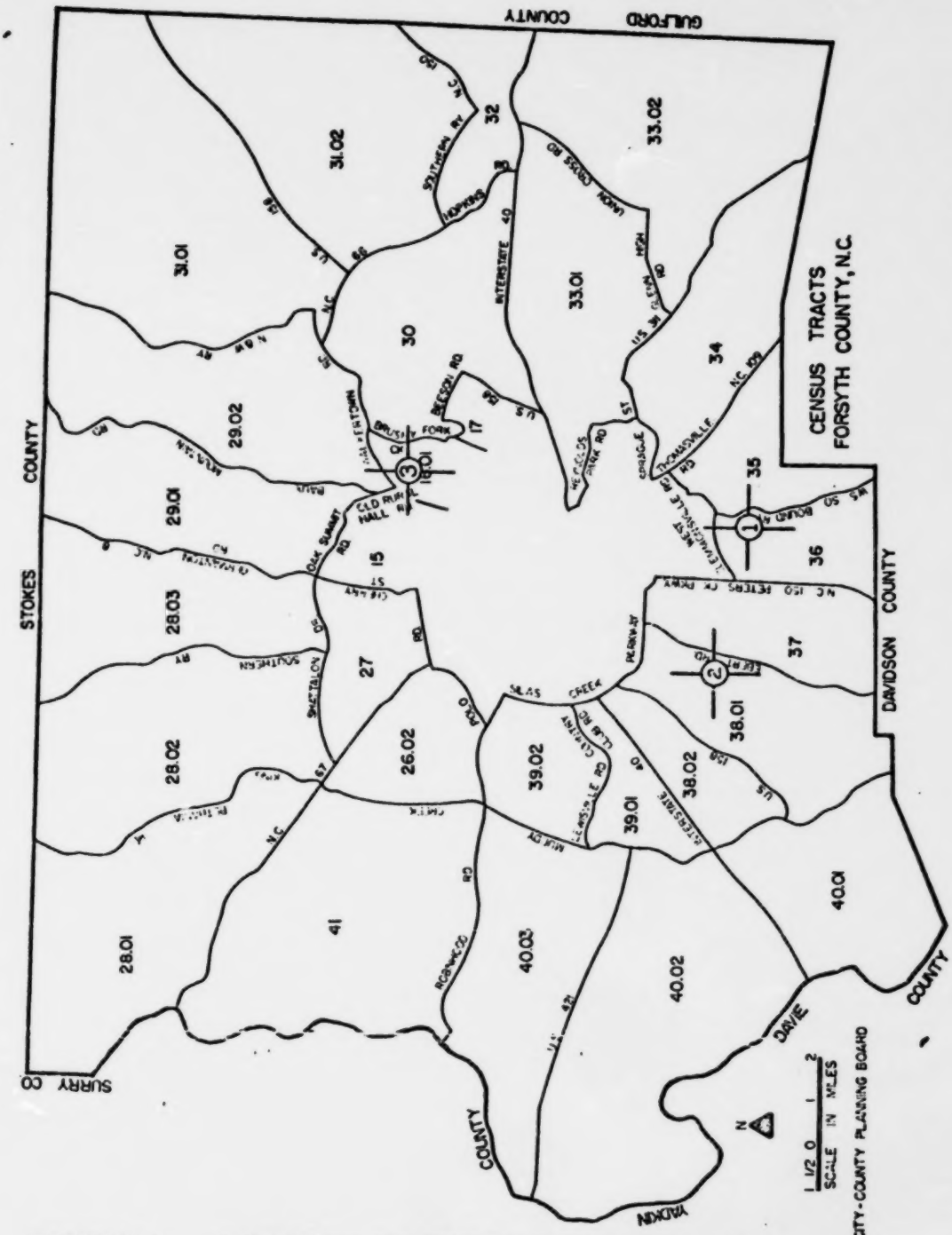


FIGURE 3: LOCATION OF EXISTING LANDFILL SITES, FORSYTH COUNTY

the allocation of cost responsibilities was established as the result of a ten week disposal survey performed during the summer of 1972. The results of the survey, jointly sponsored and administered by the city and the county, are presented in Appendix D. The principal finding was that the county, with one-third of the population, was supplying only one-eighth the waste. The total landfill costs were projected to be approximately $1.00 per ton. Thus, the county's share should be an annual disposal fee of about $37,000. At this time, the city has proposed that the county's share of expenses be set at $45,000 per year. If the county agrees to this proposal, there will be relaxation of tax assessments on the county airport which should make up for the difference between the two figures. There is a very good chance that the city offer will be accepted. Currently, the franchised county collectors may use the city operated disposal sites at no cost to them. The city also allows their local industries and private citizens the same no-cost disposal privileges.

The projected lives of the three operating disposal sites are now seven, five, and five years. The airport site is new (the seven year estimate), and the lives of the remaining two fills may be extended somewhat by the latest city land purchases.

An issue which predicated the survey effort was the desire of the county to franchise a disposal operation to a private sector company at the airport. The county felt that such a move would not be as expensive as the disposal costs at that time but the city did not share this opinion. On the advisement of the city planners, the county abandoned this proposal even though it was developed as far as a draft contract.

A second interesting side issue regarding county disposal activities was an arrangement between the county government and the Town of Kernersville. One of the county collectors collected the Kernersville area and, because of the convenience to his routes, utilized the town disposal site. The county reimbursed the town for this service at a rate of $2.00 per ton. However, Kernersville charged the collector a monthly fee of $183.70 for

the disposal privilege. This situation resulted in a disposal cost of about $3.50 per ton. Since the summer of 1969, the county government has been negotiating with Kernersville on this matter and recently the situation was resolved. The contractor may use the Kernersville site if he chooses, but the county will not subsidize his choice. The contractor may use all other legitimate disposal sites at no charge.

The principal difference of opinion between the two governments was based on the units applied to quantities of solid waste. Kernersville preferred to establish their charges on a volumetric basis while the county used weight. Kernersville claimed that the costs to dispose of twenty compacted yards of waste was about $19.00, including the cost of labor and equipment for one hour. The county regarded tonnage as the correct basis and was charged by the city of Winston-Salem about $1.00 per ton. The total Kernersville charge computes to $4.75 per ton which is excessive for landfill.

Popular acceptance of disposal sites has apparently been easy to secure. The city did prefer, however, to maintain four sites in the four quadrants of the county because it was felt that this policy would geographically distribute the site location obligation. Additionally, transportation times to and from the landfills from city routes would have been shorter. The county feels that only two sites are needed, one north and one south. This condition would give rise to lower capital and operating costs and would not be any less convenient to county collectors. City collection, however, would be affected as there would be fewer close-in sites.

The future trends of the Forsyth County and Winston-Salem City disposal operation will depend significantly on the rate of success of the county clean-up program. As more and more county residents elect solid waste collection services because of legal pressures, there will be an increasing disposal load. This will shift the respective burdens on each government but is not expected to lighten either.

5.5: Equipment Description

The sanitation equipment information which is available for the franchised collection system within Forsyth County is not as detailed as the information maintained by municipal solid waste management organizations. In theory, because collectors must renew their applications yearly and must have a permit from the Health Department, the franchised collection system should enable county representatives to be thoroughly familiar with the operators and the equipment which they use. Indeed, records are kept indicating the number and types of vehicles used by the collectors. However, the most recent survey conducted by the county's Bureau of Environmental Health resulted in data which, in the Bureau's own words, "should be considered 'the best information available' as there is no guarantee that the trash haulers gave accurate information." In many instances, the Health Department found trash haulers surveyed to be uncooperative and, in some cases, "downright belligerent." Except for one company, no franchised operator owns more than three trucks, and only two companies keep a reserve vehicle. Table 10 presents the equipment data which are available from the Forsyth County Health Department.

5.5.1: Equipment Maintenance and Repair Policies

No data are available on equipment maintenance and repair. Most vehicles operated are quite old; the average is almost 8 years old. It was suggested by county personnel that most operators are their own mechanics which is characteristic of small collection firms. While this arrangement does allow the owner to have intimate knowledge of his equipment, it does not provide for expert or permanent repairs. Also, because most collectors do not have reserve vehicles, their operations are vulnerable to any mechanical failure. Additionally, there is no indication that any collector operating in Forsyth County performs more than routine "cursory" preventive maintenance and normal lubrication procedures.

5.6: Financial Characteristics of Forsyth County's Solid Waste System

The collectors operating within Forsyth County pay a yearly franchising fee of ten dollars which permits them to operate in the county. They are not charged for disposal at the landfills.

TABLE 10

EQUIPMENT DATA FOR FORSYTH COUNTY'S FRANCHISED COLLECTION SYSTEM

Operator	Chassis/Body	Type	Capacity[1]	Years
1	GMC/N.A.	N.A.	20	1972
	Chevrolet	Dump truck	14	1971
	GMC	Dump truck	12	1969
	Chevrolet/N.A.	N.A.	16	1968
	GMC/N.A.	N.A.	16	1968
	Harvester/Truxmore	Packer	18	1967
	GMC/Truxmore	Packer	18	1965
	GMC/N.A.	N.A.	16	1965
	N.A.	Pick-up	3/4 ton	1967
2	Chevrolet/N.A.	Packer	18	1969
	International Harvester/N.A.	Packer	18	1965
	Chevrolet/Truxmore	Packer	18	1963
3	International Harvester/Heil	Packer	16	1965
	Ford/Baker	Packer	12	1960
4	International Harvester/N.A.	Packer	10	1956
	N.A.[2]	N.A.	N.A.	N.A.

1/ All capacities are in cubic yards unless otherwise indicated

2/ Reserve vehicle

TABLE 10 (Continued)

Operator	Chassis/Body	Type	Capacity	Years
5	N.A./Truxmore	Packer	18	1970
6	Dodge/N.A.	Packer	9	1970
7	Chevrolet/Pakmor Dodge/Truxmore	Packer Packer	16 23	1966 1964
8	International Harvester/N.A.	Packer	12	1960
9	GMC/N.A. N.A.[2/]	Scow Pick-up	N.A. 3/4 ton	1956 N.A.
10	Reo/N.A. Ford/N.A.	Scow Scow	N.A. N.A.	1961 N.A.
11	Dodge/N.A.	N.A.	14	1959
12	Chevrolet/N.A.	Packer	12	1963
13	N.A. N.A.	N.A. N.A.	20 16	1968 1958

[2/] Reserve vehicle

5.6: Financial Characteristics of Forsyth County's Solid Waste System

The collectors operating within Forsyth County pay a yearly franchising fee of ten dollars which permits them to operate in the county. They are not charged for disposal at the landfills.

The county expects to pay approximately $45,000 to the City of Winston-Salem this fiscal year for disposal. This charge reflects the county's share of the operating cost of the landfills. The county owns one of the three landfills in the county. There was no acquisition cost tied to the purchase of this land, as the property was previously owned by the county and city. Current plans call for the future conversion of this landfill into a 189-acre park at a cost of $245,000.

Based upon the number of dwellings served by each collector and the county-imposed collection charge, it is possible to compute estimates of the minimum annual revenue each collector earns. These revenue figures and the figures from which they were derived are shown in Table 11. Unfortunately, there is no cost data associated with these figures so estimates of gross profit cannot be computed.

TABLE 11

ESTIMATED MINIMUM REVENUE BY COLLECTOR AND FOR THE COUNTY

	Collection Company														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total
Residential Units	5,500	1,783	475	815	275	900	775	1,847	600	475	232	275	575	425	15,042
Annual User Charge per Residential Unit	42.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total Revenue	231,000	74,866	19,950	34,230	11,550	41,580	32,550	77,574	25,200	19,950	9,744	11,550	24,150	17,850	631,764

APPENDICES

APPENDIX A

ENABLING ORDINANCE FOR COLLECTION SYSTEM

ADOPTED

APR 10 1972

FORSYTH COUNTY
BOARD OF COMMISSIONERS

ITEM NO. 12

ORDINANCE GOVERNING THE MANAGEMENT, COLLECTION, TRANSPORTATION AND DISPOSAL OF SOLID WASTE IN FORSYTH COUNTY; PROVIDING FOR THE FRANCHISING THEREOF; AND REGULATING THE FEES CHARGED FOR SAID SERVICES

WHEREAS, it is in the best interest of the citizens of Forsyth County that the management, collection, and disposal of solid waste be regulated to minimize health hazards, encourage and attempt to insure an adequate and continuing service of collection and disposal, and to promote the use of approved collection and disposal facilities, all in the interests of promoting the health, safety, and welfare of the inhabitants of the County; and

WHEREAS, the Board of Commissioners possesses the authority, pursuant to Article 22 of Chapter 153 of the North Carolina General Statutes and other applicable laws, to regulate the collection and disposal of solid waste by persons, firms, or corporations, including licensing and the granting of franchises or exclusive rights; to establish and operate disposal facilities; and to regulate the removal and method or manner of disposal or deposit of any waste matter whatsoever;

NOW, THEREFORE, BE IT ORDAINED by the Board of County Commissioners of Forsyth County:

SECTION 1. DEFINITIONS

For the purposes of this Ordinance, the following words and phrases shall have the meanings set forth herein below:

A. Garbage - all putrescible wastes, including animal and vegetable matter, animal offal and carcasses, and recognizable industrial by-products, but excluding sewage and human wastes.

B. Refuse - all non-putrescible wastes of any nature.

C. Solid Waste - garbage, refuse, rubbish, trash, and other discarded solid materials, including solid waste materials resulting from industrial, commercial, and agricultural operations, and from community activities, but does not include solids or dissolved materials in domestic sewage or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial waste water effluents, dissolved materials in irrigation return flows or other common water pollutants.

D. Management of solid waste - the control, storage, collection, transportation, and disposal of all forms of solid waste.

E. Disposal of solid waste - the burial, treatment, and final disposition of solid waste.

F. Solid waste disposal - the collection, storage, treatment, utilization, processing, or final disposition of solid waste.

G. Solid waste disposal facility - land, personnel, equipment, or other resources used in the disposal of solid wastes.

H. Solid waste disposal site - any place at which solid wastes are disposed of by sanitary landfill or any other methods.

I. Open dump - the consolidation or collection of solid waste from one or more sources at a disposal site which has unsanitary conditions, insignificant or no cover, insignificant or no management. This term shall include any disposal area which has not been approved by applicable Forsyth County and State Boards of Health regulations.

NOW, THEREFORE, BE IT ORDAINED by the Board of County Commissioners of Forsyth County:

SECTION 1. DEFINITIONS

For the purposes of this Ordinance, the following words and phrases shall have the meanings set forth herein below:

A. Garbage - all putrescible wastes, including animal and vegetable matter, animal offal and carcasses, and recognizable industrial by-products, but excluding sewage and human wastes.

B. Refuse - all non-putrescible wastes of any nature.

C. Solid waste - garbage, refuse, rubbish, trash, and other discarded solid materials, including solid waste materials resulting from industrial, commercial, and agricultural operations, and from community activities, but does not include solids or dissolved materials in domestic sewage or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial waste water effluents, dissolved materials in irrigation return flows or other common water pollutants.

J. Person - means any individual, firm, organization, partnership, corporation, company, or other legal entity.

K. Solid waste collector - means any person who collects and/or transports solid waste.

L. Sanitary landfill - a method of disposing of solid waste on land in a sanitary manner without creating nuisances or hazards to public health or safety by utilizing the principles of engineering to confine the solid waste to the smallest practical area, to reduce it to the smallest practical volume, and to cover it with a layer of compacted earth at the conclusion of each day's operation or at such more frequent intervals as may be necessary.

M. Putrescible - solid waste capable of being decomposed by microorganisms with sufficient rapidity as to cause nuisances from odors and gases, such as kitchen wastes, offal and carcasses.

N. Board - the Board of County Commissioners of Forsyth County, North Carolina.

O. Health Director - the Director of the Forsyth County Health Department or his authorized representative.

P. Applicable health regulations - rules or regulations adopted by the North Carolina State Board of Health, the Forsyth County Board of Health, or both, pertaining to the management and disposal of solid waste. This definition shall include, but is not limited to, the "Rules and Regulations Providing Standards for Solid Waste Disposal" adopted by the State Board of Health as set forth in Bulletin No. 411, dated April, 1971. As amended, adopted, or now in effect, compliance with all such regulations is required as provided in this Ordinance.

SECTION 2. ADMINISTRATION

A. Additional regulations pertaining to the management of solid waste other than set forth herein may be promulgated pursuant to this Ordinance by the Board of Commissioners of Forsyth County.

B. The Health Director shall enforce all applicable health regulations. Such County officials and departments as the County Manager may designate are charged with the administration, supervision, execution and enforcement of the other provisions contained herein.

SECTION 3. SOLID WASTE STORAGE

No person owning or occupying any premises shall permit any solid waste to accumulate upon such premises that is not stored in a sanitary manner approved by applicable health regulations.

SECTION 4. SOLID WASTE COLLECTION

The owner or occupier of all premises upon which solid waste is accumulated or stored shall remove or cause to be removed or disposed of, all such materials from said premises at least once each week, meaning once each seven (7) days. Nothing herein shall be construed to allow open burning except as authorized, if at all, by applicable State and local air quality control regulations.

SECTION 5. SOLID WASTE TRANSPORTATION

No person for hire shall transport solid waste upon the public streets, roads, or highways by any mode of conveyance that has not been inspected and approved by the Health Director and certified as being in compliance with applicable health regulations, including but

not limited to all motor vehicles or vehicular devices.

SECTION 6. SOLID WASTE DISPOSAL

No person shall dispose of solid waste except by deposit in a sanitary landfill that is designed, operated, equipped, and approved in accordance with applicable health regulations; provided, this Ordinance shall not be construed to prevent any person from properly disposing of solid waste produced from his own residence or business establishment by burying it on his own property in a manner approved and authorized by applicable health regulations.

The disposal of solid waste by deposit in any open dump is hereby prohibited.

SECTION 7. COLLECTION OF SOLID WASTE

No person for hire shall collect or transport solid waste without an appropriate solid waste management permit to be issued by the Health Director upon compliance with Section 5 and other applicable provisions of this Ordinance.

No person shall collect or transport solid waste except in accordance with applicable health regulations.

A. The Health Director shall issue no permits for the collection or transportation of solid waste without inspection of the facilities, equipment and proposed operating methods of any person making application therefor, and certifying that said facilities, equipment, and operating methods are in compliance with applicable health regulations.

B. Permits for collection and transportation of solid waste shall be issued for a one (1) year period, and shall be renewable for similar periods. Any permit may be revoked in the manner prescribed by the Health Director for violation of applicable health regulations pertaining to the management of solid waste material.

C. Whenever upon the inspection of facilities, equipment or operating methods of any person holding a permit to collect or to transport solid waste, the Health Director finds that conditions or practices of said permit holder are in violation of applicable health regulations, the Health Director shall give notice by registered or certified letter addressed to such person that unless such conditions or practices are corrected within ten (10) days, the permit will be revoked. At the expiration of the ten (10) day period, the Health Director shall make a reinspection; and if he finds that such conditions or practices have not been corrected, he shall give notice in writing to the permit holder that the permit has been revoked. Upon receipt of notice or refusal of acceptance, no person whose permit has been revoked shall thereafter collect or transport solid waste. No such permit shall be reinstated by the Health Director until he finds, upon inspection, that all applicable health regulations have been complied with.

D. A record of permits granted and revoked shall be transmitted to the Board, through the County Manager, after issuance or revocation.

SECTION 8. FRANCHISES

No person shall collect, transport or dispose of solid waste for a fee, hire, or consideration unless such person holds a valid, current franchise issued by Forsyth County empowering him to so collect, transport or dispose of solid waste, and describing the territory or area for which the franchise is issued. The term "dispose of" shall mean persons who propose to operate a sanitary landfill to receive solid waste for burial or other treatment.

The Board of County Commissioners may grant exclusive rights or franchises to transport, collect, or dispose of solid waste within a specified area, and may specify the period for which the franchise is effective. It shall be unlawful for unauthorized persons to transport, collect, or dispose of solid waste within said specified areas.

A. Requirements

No franchise to collect and transport or dispose of solid waste within Forsyth County shall be valid unless the franchise holder:

(1) holds a currently valid solid waste management permit issued by the Forsyth

County Health Director to collect and transport solid waste;

(2) complies with this Ordinance and all applicable health regulations.

B. Applications, Procedures, and Information

Applications for franchises shall be filed with the Board, through the County Manager, on forms prescribed by the County Manager and setting forth the following information and such other information as the County Manager may request in order that the Board may properly consider the application:

(1) Full name and address of applicant and whether a proprietorship, corporation, or partnership, with disclosure of ownership interests.

(2) Type of franchise (collection and transportation or disposal) and proposed area for which the franchise is requested (with a list of residents or customers presently served therein, if any).

(3) An itemized list of the applicant's equipment intended to serve the franchised area.

(4) Experience, if any, which the applicant has in rendering the services for which the franchise is requested.

(5) Balance sheet or equivalent financial statement submitted as of the close of the applicant's last business year showing the net worth of said business.

C. Requirements

Franchises shall be granted only upon the Board being satisfied that the applicant will render prompt, efficient, and continuing service to the area for which the franchise is granted, and that the applicant has sufficient equipment and personnel to render such service to all within the franchised area.

The Board shall determine the area for which the franchise is granted, and its decision shall be final.

D. Non-transferability and Abandonment of Franchises

No franchise shall be transferred by a holder without the prior approval of the Board of Commissioners of Forsyth County, and no person shall abandon a franchise without thirty (30) days prior written notice thereof being given to the Board, through the County Manager. The Board may grant temporary franchises to provide service in the event of abandonment or for other good cause.

E. Termination

All or any portion of a franchise may be terminated or suspended for the following reasons:

(1) Loss of solid waste management permit by the franchise holder.

(2) Non-compliance with the franchise, collection and transportation, or disposal fee schedules promulgated by the Board of County Commissioners.

(3) The attempted transfer of a franchise without prior approval of the Board of County Commissioners.

(4) Failure to render prompt and effective service to persons within the area in which the franchise holder has a permit to operate.

(5) Failure to comply with any provisions of this Ordinance or applicable health regulations.

Complaints or grievances may be brought to the County's attention by submission in writing to the County Manager or his representatives.

F. Conflicts

All conflicts and disputes regarding the granting of a franchise and disagreements over franchised territory shall be determined by the Board of County Commissioners, and its decision shall be final.

G. Schedule of Fees

Any person operating under a franchise shall present to each customer in advance of any agreement with that customer a schedule of his fees as authorized herein to be charged. All ~~garbage~~ solid waste shall be removed from the customer's premises at least once per week, provided the customer is no more than thirty (30) days in arrears in payments.

H. Non-exclusive Franchises

Notwithstanding any provisions of this Ordinance to the contrary, the Board of County Commissioners shall also have the authority to grant non-exclusive franchises for the collection of solid waste from commercial, industrial and business establishments throughout Forsyth County.

I. Records

A record of all franchises, defining the areas by geographical features identifiable on the ground or other appropriate description and enumerating the holders of each franchise, shall be maintained in the office of the Clerk to the Board of Forsyth County.

SECTION 9. FEES

A. Franchise Fees

The Board of County Commissioners may adopt uniform franchise fees for (1) collection and transportation, and (2) disposal franchises, which shall be paid to the County in consideration of receiving or being issued a franchise.

Regulations may be adopted pertaining to the payment of franchise fees, period for which the fee applies, methods for computing or determining the fee (if other than lump sum), and other matters.

B. Collection and Disposal Fees

The Board of County Commissioners shall set and approve all fees charged for the collection, transportation, and disposal of solid waste, including those of sanitary landfill operators, prior to the granting of any franchise. The Board shall regulate and may classify fees according to residential, business and commercial services so that reasonable compensation may be provided for such services in accordance with the best interest of the public.

C. Filing

A copy of all fee schedules and franchises shall be filed in the office of the Clerk to the Board of Forsyth County.

D. Amendments

All fee schedules may be amended or altered from time to time by the Board. Regulations may provide for the period during which the schedules are to be effective.

SECTION 10. VIOLATIONS

Any person, firm or corporation who violates the provisions of this Ordinance shall be guilty of a misdemeanor,

and shall be fined not more than fifty dollars ($50.00) or imprisoned for not more than thirty (30) days.

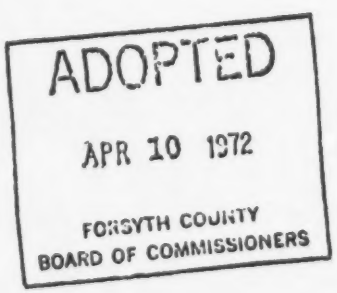
SECTION 11. SEVERABILITY

If any section, provision, or part of this Ordinance shall be adjudged invalid by a court of competent jurisdiction, such invalidity shall not affect the validity of the Ordinance as a whole or of any other section, provision, or part hereof.

SECTION 12. EFFECTIVE DATE

This Ordinance shall become effective at 12:01 A. M., of the 1ST day of July, 1972.

Adopted this the 10th day of April, 1972.



APPENDIX B

ORDINANCE TO FRANCHISE COLLECTORS

ADOPTED

JUN 19 1972

FORSYTH COUNTY
BOARD OF COMMISSIONERS

AN ORDINANCE GRANTING FRANCHISES FOR THE COLLECTION AND TRANSPORTATION OF SOLID WASTE, AND DEFINING THE FRANCHISE AREAS; FIXING THE FRANCHISE FEE; ESTABLISHING MAXIMUM CHARGES FOR THE COLLECTION AND TRANSPORTATION OF STORED RESIDENTIAL SOLID WASTE; AND REQUIRING RESIDENTIAL SERVICES

WHEREAS, the Board of County Commissioners has previously adopted an ordinance governing the management, collection, transportation, and disposal of solid waste, including provisions for the granting of franchises and the regulation of charges, effective July 1, 1971; and

WHEREAS, pursuant to said ordinance, applications for franchises have been received by the County, said ordinance requiring all collectors to be duly franchised by the County; and

WHEREAS, the Board does hereby resolve to grant franchises, fix the franchise fee, establish maximum charges for residential collection and transportation, and require residential services as set forth herein below, as part of and all as provided in the aforesaid ordinance;

NOW, THEREFORE, BE IT RESOLVED by the Board of County Commissioners of Forsyth County as follows:

Section 1. Franchise Holders

Franchises for the collection and transportation of solid waste are hereby granted to those persons set forth in the attached document entitled "Franchise Holders (Solid Waste Collection and Transportation)," incorporated herein by reference, for the type of service indicated therein.

Section 2. Franchise Areas

The franchise holders as set forth in Section 1 above are hereby granted franchises for the areas set forth in the attached document entitled "Franchise Areas," incorporated herein by reference. The attached "Map of Franchise Areas," indicating and designating the franchise areas by franchise numbers, is hereby adopted and incorporated herein by reference.

Section 3. Nature of Franchises

The franchises for residential and small business service granted shall be and are hereby adopted as exclusive franchises. The containerized commercial and industrial franchise herein granted shall be nonexclusive and continuing. Residential franchises are granted for a period of one (1) year beginning July 1, 1972, and are subject to renewal annually thereafter.

Section 4. Franchise Fee

There is hereby imposed for each franchise granted a lump sum fee of Ten Dollars ($10.00) for the first year, beginning July 1, 1972, payable to Forsyth County in consideration of the issuance of said franchise.

Section 5. Establishment of Maximum Fees or Charges for Certain Residential Collection and Transportation and Required Services

There is hereby established and imposed a maximum collection and transportation fee or charge for residential service (meaning once per week pickup of stored solid waste, not exceeding two containers or cans, each of a capacity of thirty gallons or less) of Three Dollars and Fifty Cents ($3.50) per household per month. Fees or charges for additional or special services other than as specified herein may be agreed upon by the parties, subject to County review and approval as to reasonableness

Within the franchise area, the franchise holder must provide service to everyone who requests it for domestic and household and small business solid waste disposal and related additional or special services. The County may from time to time require residential franchise holders to provide special programs of solid waste collection sponsored and paid for by the County.

Section 6. Other Charges

Fees or charges for containerized commercial or industrial service may be negotiated to the satisfaction of the parties concerned.

Section 7. Record of Franchises

Approved franchise applications and the documents described in this ordinance shall be maintained and kept on file in the office of the Clerk to the Board.

Section 8. Condition

The franchises granted in this ordinance are conditioned upon compliance with all applicable state and local rules, regulations, and ordinances.

Section 9. Incorporation

The provisions contained herein shall constitute part of the ordinance governing solid waste adopted by the Board on April 10, 1972.

Section 10. Effective Date

This ordinance shall become effective on July 1, 1972.

This the 19th day of June, 1972.

APPENDIX C

ENFORCEMENT LETTERS

FORSYTH COUNTY HEALTH DEPARTMENT
P. O. BOX 2070
WINSTON-SALEM, N. C. 27103

BOARD OF HEALTH
R. L. Smith, M. D., Chm.
David W. Darr
Mary I. Griffith, M. D.
Franklin R. Shirley, PH. D.
J. Harry Spillman, D. D. S.
Marvin M. Ward
James A. Way, Jr.

Dear

On _____, your property located at _____ _____ was visited by _____ of the Forsyth County Health Department.

It was determined that solid waste materials described as _____ _____ located on your property is in violation of Article 13 B of Chapter 130 of the General Statutes of North Carolina. Violation of the regulation is a misdemeanor and punishable by a fine not to exceed ($50.00) or by imprisonment not to exceed thirty (30) days, as provided by Section 203 of Chapter 130 of the General Statutes of North Carolina.

Please inform this department on or before _____ of what arrangements you have made to correct this situation.

Your immediate attention and cooperation in this matter will be greatly appreciated.

Sincerely yours,

BUREAU OF ENVIRONMENTAL HEALTH

_____

Phone: 727-2302 or 727-2297
between 8:00 to 9:00 a.m.
or from 1:00 to 1:30 p.m.

FORSYTH COUNTY HEALTH DEPARTMENT
P. O. BOX 2978
WINSTON-SALEM, N. C. 27102

Telephone 727-2434

BOARD OF HEALTH
R. L. Smith, M. D., Chm.
David W. Darr
Mary I. Griffith, M. D.
Franklin R. Shirley, Ph. D.
J. Harry Spillman, D. D. S.
Marvin M. Ward
James A. Way, Jr.

CERTIFIED

Dear

On _____, you were sent a letter requesting that you notify this department on or before _____ of the arrangements you had made to eliminate the problem of solid waste described as _____ located on your property.

Our records show that you have not made a satisfactory agreement with this department as to when the necessary clean up will be made.

This letter is official and final notice that unless you contact the Forsyth County Health Department on or before _____ and make a satisfactory agreement as to when this unsanitary condition will be corrected, it will be necessary that we take appropriate legal action.

Violation of any rule or regulation of the Board of Health is a misdemeanor punishable by a fine not to exceed $50 or thirty (30) days imprisonment.

Your immediate attention to this matter will be greatly appreciated.

Sincerely,

_____
Bureau of Environmental Health

Phone:
727-2302 or 727-2297
between 8:00 a.m. to 9:00 a.m.
or from 1:00 p.m. to 1:30 p.m.

Telephone: 727-2400

FORSYTH COUNTY HEALTH DEPARTMENT

P. O. BOX 2978

WINSTON-SALEM, N. C. 27102

BOARD OF HEALTH

R. L. Smith, M. D., Chm.

David W. Darr

Mary I. Griffith, M. D.

Franklin H. Shirley, DDS, D.

J. Harry Spillman, D. D. S.

Marvin M. Ward

James A. Way, Jr.

Dear

In order to protect the health and welfare of the people of Forsyth County and in the interest of maintaining our environment within our county, an investigation has been made of your property located at _____ on _____ by _____ of the Forsyth County Health Department.

Our investigation indicates that you do not have the storage or disposal of solid waste (garbage) by a sanitary method as described by the North Carolina State Board of Health.

The disposal of solid waste shall be by one of the following approved methods:

A. Hire the collector assigned to your area. (your area franchised collector is:_____
Phone number - _____.

B. Transport your solid waste to a sanitary landfill in an approved manner.

Violation of the Rules and Regulations adopted by the North Carolina State Board of Health and of Forsyth County is a misdemeanor and is punishable by a fine not to exceed $50.00 or by imprisonment not to exceed 30 days as provided by Section 203 of Chapter 130 of the General Statutes of North Carolina.

Please inform this department on or before _____ of what arrangements you have made to correct this situation.

Your immediate attention and cooperation in this matter will be greatly appreciated.

Sincerely,

BUREAU OF ENVIRONMENTAL HEALTH

_____

Phone: 727-2302 or 727-2297
between 8:00 to 9:00 a.m.
or from 1:00 to 1:30 p.m.

FORSYTH COUNTY HEALTH DEPARTMENT
P. O. BOX 2675
WINSTON-SALEM, N. C. 27102

Telephone 727-2434 727-2302

BOARD OF HEALTH

R. L. Smith, M. D., Chm.
David W. Darr
Mary I. Griffith, M. D.
Franklin R. Shirley, PH. D.
J. Harry Spillman, D. D. S.
Marvin M. Ward
James A. Way, Jr.

Dear

Our thanks and appreciation is extended to you for having cleaned up and properly disposed of the dump located on your property.

In order to protect the health and welfare of the people of Forsyth County, and in the interest of maintaining our environment within our county, it is the duty and responsibility of each land owner to keep his property in a sanitary and nuisance-free manner. As in your case, we need and appreciate the earnest cooperation in ridding these hazardous dumps. We all need a cleaner, greener, and healthier North Carolina.

If we can be of any further assistance, please get in touch with us.

Thank you again for your cooperation in this matter.

Sincerely,

BUREAU OF ENVIRONMENTAL HEALTH

FORSYTH COUNTY HEALTH DEPARTMENT
P. O. BOX 2978
WINSTON-SALEM, N. C. 27102

Telephone 727-2484 2302

BOARD OF HEALTH

R. L. Smith, M. D., Chm.
David W. Darr
Mary I. Griffith, M. D.
Franklin R. Shirley, PH. D.
J. Harry Spillman, D. D. S.
Marvin M. Ward
James A. Way, Jr.

Dear

It has come to our attention that solid waste materials traceable to you at your address have been found at _____
_____.

It is illegal in the State of North Carolina to dump solid waste along the roadside or in any other place that is not designated as a sanitary landfill. Violation of any of the rules and regulations by the North Carolina State Board of Health is a misdemeanor and is punishable by a fine not to exceed $50.00 or by imprisonment not to exceed 30 days, as provided by Section 203 of Chapter 130 of the General Statutes of North Carolina.

We will appreciate your picking up the solid waste mentioned above and depositing it at one of the following landfills:

Overdale Landfill - off West Clemmonsville Road
Ebert Street Landfill - South of Silas Creek Parkway
Airport Landfill - off Carver Road on Airport Road

In the future you will be expected to either hire a county franchised trash collector or dispose of your solid waste at the above mentioned landfills.

Sincerely,

BUREAU OF ENVIRONMENTAL HEALTH

_____

APPENDIX D

DISPOSAL SURVEY

LANDFILL SURVEY

FORSYTH COUNTY, N. C.

Jointly Sponsored by:

City of Winston-Salem
and
County of Forsyth

6-11-72 through 8-19-72

(10 Consecutive Weeks)

ANALYSIS & INTERPRETATION

September, 1972

Resulting from ten consecutive weeks of tabulating information relative to the material deposited in the three landfills operated by the City of Winston-Salem, the following landfill survey is presented. The information contained in this report has been compiled by various classes of solid waste. Data is recorded for each day, location, carrier, vehicle, origin, type, compaction, weight, volume, and character of material. The data is assembled to indicate information desired by Forsyth County and the City of Winston-Salem. Presently about one-third of the County residents live outside of the City limits and deliver approximately one-eighth of the total refuse to the three landfills. One immediate noteworthy fact is that about 50% of all refuse handled is paper. Additionally, we know that newspaper is the largest paper product and that one ton of recycled newspaper will save about seventeen trees. This important aspect of the survey points up a need for further analysis of the requirement to recycle newspaper utilizing a positive county-wide effort. One possibility is that all fire stations could serve as focal points for newspaper collections.

Based on the current budget of $275,000 for landfill operation and capital equipment cost of another $50,000, the total landfill cost for the three landfills surveyed will approximate $325,000 for Fiscal Year 1973. Based on these figures, the City of Winston-Salem is burying its solid waste for about one dollar per ton. This information is a definite measurement of the present cost of operation, but does not readily indicate the total effectiveness of the overall program.

There are certain environmental impacts that will require additional evaluation and study to develop standards and provide goal setting techniques. Only with continuous knowledge of the many details of landfill operations can we compare principal alternatives necessary for management decisions. This survey has been the initial step in gathering the information required to operate an economical and effective Solid Waste Program for the County.

FORSYTH COUNTY

CLASSIFICATIONS OF SOLID WASTE MATERIALS

1. Garbage	Wastes from the preparation, cooking, and serving of food. Waste from the handling, storage, and sale of produce and meats.
2. Degradable/Combustible Rubbish	Paper, cardboard, wood boxes, excelsior, rags, cloth, bedding, leaves, grass, brush, and miscellaneous wood.
3. Special Bulky Wastes	Metals, auto parts, tires, glass, plastics, appliances, furniture, pallets and hogsheads.
4. Construction and Demolition	Roofing, tar paper, rubble, broken concrete, plaster, conduit, pipe, insulation, etc.
5. Chemical Wastes	Liquids (corrosive), liquids (non-corrosive), solids (corrosive), oil, and petroleum.

Survey Classes	Compacted Weights	Weights (loose)
1. 01, 04	500/400	200
2. 05, 09, 10, 18, 21	500/400	200
3. 07, 11, 12, 13, 16, 20, 23		400
4. 17, 22		2000
5. 02, 03, 06, 08		1700
6. 19 (Sand & Dirt)		2700

LANDFILL SURVEY

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Survey Week-Number Dates

WEEK 1 = 6/11-6/17 (4 days)
WEEK 2 = 6/18-6/24
WEEK 3 = 6/25-7/01
WEEK 4 = 7/02-7/08
WEEK 5 = 7/09-7/15
WEEK 6 = 7/16-7/22
WEEK 7 = 7/23-7/29
WEEK 8 = 7/30-8/05
WEEK 9 = 8/06-8/12
WEEK 10= 8/13-8/19

SYNOPSIS

By cubic yards, solid waste from the city provided 86% of the quantity, and solid waste from outside the city provided 14% of the quantity put in all three landfills during the 10 week survey period (bottom of Page 1).

By weight, the city provided 87.6% and outside the city provided 12.4%.
(page 3-A city total weight = 99,011,900 lbs.;
page 3-B outside city total weight = 13,942,300 lbs.)
grand total weight = 112,954,200

$$\text{city} \quad \frac{99,011,900}{112,954,200} = .877 = 87.7\%$$

$$\text{outside city} \quad \frac{13,942,300}{112,954,200} = .123 = 12.3\%$$

Assuming solid waste is deposited at the same rate for an entire year, 587,361,840 pounds (112,954,200 x 5.2) or 293,681 tons would be processed per year.

If each non-compacted cubic yard was compacted by one half during the burying operation, a total of 186,168 cubic yards of solid waste were buried during the ten weeks. Projected to one year, this would be 968,074 cubic yards of solid waste.

Non-compacted yards:	city	144,843 ÷ 2 =	72,421
	outside city	23,756 ÷ 2 =	11,878
Compacted yards:	city		85,443
	outside city		16,426
Total compacted yards (10 weeks)			186,168
			x 52
Total cubic yards (one year)			968,074

TOTAL CUBIC YARDS BY WEEK, BY LANDFILL

EBERT

	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	TOTAL
CITY	9212	9836	11745	10657	9070	10581	9236	9485	10276	9280	99378
OUTSIDE CITY	842	1138	923	1210	1406	1685	1768	1201	1790	1588	13551

OVERDALE

	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	TOTAL
CITY	4512	4604	5594	5004	5397	5762	5552	5872	6462	7416	56175
OUTSIDE CITY	789	927	1068	789	1121	1031	1048	1114	934	1061	9882

AIRPORT

	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	TOTAL
CITY	4756	6935	8484	6381	7554	7938	8441	8044	8544	8040	75117
OUTSIDE CITY	1092	680	1122	942	1536	1781	1666	2116	1925	1440	14300

TOTAL OF ALL LANDFILLS

	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	TOTAL
CITY	18480	21375	25823	22042	22021	24281	23229	23401	25282	24736	230670
OUTSIDE CITY	2723	2745	3113	2941	4063	4497	4482	4431	4649	4089	37733

ALL LANDFILLS BY PERCENT

	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	TOTAL
CITY	87%	89%	89%	88%	84%	84%	84%	84%	84%	86%	86%
OUTSIDE CITY	13%	11%	11%	12%	16%	16%	16%	16%	16%	14%	14%

TOTAL CUBIC YARDS BY WEEK FOR OUTSIDE CITY AND CITY

CITY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10
DOMESTIC	7460	9028	11589	10883	9870	10714	10093	9507	11052	10338
NON-DOMESTIC	11020	12348	14234	11159	12151	13567	13136	13894	14229	14398

OUTSIDE CITY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10
DOMESTIC	1476	1682	2142	2103	2190	2419	2535	2452	2570	2403
NON-DOMESTIC	1247	1063	971	838	1873	2078	1947	1979	2079	1686

OVERALL AS PERCENT OF TOTAL

	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10
CITY DOMESTIC	35%	38%	40%	43%	38%	37%	36%	34%	36%	36%
OUTSIDE CITY DOMESTIC	7%	7%	8%	8%	8%	9%	9%	9%	9%	8%
CITY NON-DOMESTIC	52%	51%	49%	45%	46%	47%	48%	50%	48%	50%
OUTSIDE NON-DOMESTIC	6%	4%	3%	3%	7%	7%	7%	7%	7%	6%

CITY CUBIC YARDS BY CLASS OF WASTE

SUMMARY OF ALL WEEKS

	COMPACTED		NON-COMPACTED	
	CUBIC YARDS	WEIGHT	CUBIC YARDS	WEIGHT
)1 ANIMAL WASTE 500/400-200	132	66,000	234	46,800
? CHEMICAL LIQUID - 1700			352	598,400
)3 CHEMICAL SOLID - 1700			253	430,100
)4 H H GARBAGE 500/400-200	44,899	22,449,500	7909	1,581,800
5 LEAVES 500/400-200	490	248,000	3930	786,000
)6 LIQUID WASTE - 1700			649	1,103,300
)7 METAL - 400			4377	1,750,800
)8 OIL - 1700			60	102,000
9 PAPER 500/400-200	39,551	19,775,500	44,394	8,878,800
BRUSH 500/400-200	179	89,500	41,558	8,311,600
1 TIRES - 400			2,960	1,184,000
2 APPLIANCES - 400			8,676	3,470,400
3 HOGSHEADS - 400			1,391	556,400
6 PALLETS - 400			3,064	1,225,600
7 DEMOLITION - 2000			4,933	9,866,000
8 MISC. WOOD			13,238	5,295,200
9 SAND - 2700			3,112	8,402,400
0 PLASTIC - 400			760	304,000
1 CLOTH 500/400-200	108	54,000	1,513	302,600
2 ROOFING - 2000			963	1 926,000
3 GLASS - 400			324	129,600
OTHER 500/400-200	84	42,000	193	38,600
TOTAL	85,443	42,751,500	144,843	56,290,400

ote: figures beside waste class name indicates weights per cubic yard
Example. 500/400-200 indicates city compacted = 500lbs/cu. yd; county compacted = 400 lbs/ cu. yd.; non-compacted = 200 lbs/ cu. yd.
The city compactor trucks produce a more compacted, heavier, cubic yard.

OUTSIDE CITY CUBIC YARDS BY CLASS OF WASTE

SUMMARY OF ALL WEEKS

	COMPACTED		NON-COMPACTED	
	CUBIC YARDS	WEIGHT	CUBIC YARDS	WEIGHT
01 ANIMAL WASTE 500/400-200				
02 CHEMICAL LIQUID - 1700			57	96,900
03 CHEMICAL SOLID - 1700			1	1,700
04 H H GARBAGE 500/400-200	11,970	4,788,000	5,296	1,059,200
05 LEAVES 500/400-200	16	6,400	302	60,400
06 LIQUID WASTE - 1700			269	457,300
07 METAL - 400			1,233	439,200
08 OIL - 1700			13	22,100
09 PAPER 500/400-200	4,390	1,756,000	9,214	1,842,800
10 BRUSH 500/400-200	50	20,000	1,264	252,800
11 TIRES - 400			388	155,200
12 APPLIANCES - 400			2,696	1,078,400
13 HOGSHEADS - 400			0	0
16 PALLETS - 400			500	200,000
17 DEMOLITION - 2000			213	426,000
18 MISC. WOOD - 400			1,486	594,400
19 SAND - 2700			109	294,300
20 PLASTIC - 400			212	84,800
21 CLOTH 500/400-200			130	26,000
22 ROOFING - 2000			63	126,000
23 GLASS - 400			291	116,400
OTHER 500/400-200			19	38,000
TOTAL	16,426	6,570,400	23,756	7,371,900

AIRPORT LANDFILL ONLY

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
AVERAGE NUMBER OF TRIPS		156	140	147	162	171	*
AVERAGE CUBIC YARDS COMPACTED		750	741	696	858	779	*
AVERAGE CUBIC YARDS NON-COMPACTED		979	911	961	1065	1145	*
TOTAL AVERAGE CUBIC YARDS (COMPACTED PLUS 1/2 NON-COMPACTED)		1354	1281	1309	1494	1534	*

* NOT ENOUGH DATA TO AVERAGE

BY CARRIER CODE

CARRIER CODE	CARRIER NAME	NUMBER OF TRIPS	CUBIC YARDS COMPACTED	CUBIC YARDS NON-COMPACTED
00	PRIVATE CITIZEN	6,178	2,331	15,119
01	FORSYTH GARB. SERV.	668	6,189	3,281
03	JOHN C. BROWN	38	237	66
07	COMM. GARB. SERV.	46	704	76
09	SANCO	1,580	17,427	16,548
11	MOTSINGER GARB. *	3	27	- 0 -
12	HUFFMAN SANIT.	118	1,360	170
14	SUBURBAN GARBAGE	60	648	63
15	F. CALLOWAY	1	18	- 0 -
16	C. L. JESTER	63	123	771
19	WALKERTOWN SANIT.	77	153	575
20	DEZERN GARB. SERV.	39	349	92
21	MOCK-WHITMAN	92	814	176
22	ABC GARB. SERV.	52	675	62
24	STOKES GARB SERV.	1	- 0 -	9
30	CITY OF W-S	5,840	60,152	39,562
31	REYNOLDS	835	8,306	8,199
32	HANES	84	188	1,695
33	SCHLITZ	6	10	14
34	PRIVATE BUSINESS	8,132	9,327	65,805
35	NON-PROFIT	426	830	3,688
36	OTHER GOVERNMENT	532	915	3,403
37	MISCELLANEOUS	24	129	146

THE TOTAL NUMBER OF CUBIC YARDS (BOTH COMPACTED AND NON-COMPACTED) WILL NOT EQUAL THE TOTAL CUBIC YARDS BY CLASS OF WASTE PRESENTED ON PAGES 3-A AND 3-B. THIS IS BECAUSE IN TOTALING BY CLASS OF WASTE ON PAGES 3-A AND 3-B WASTE INCORRECTLY CODED AS COMPACTED WAS ADDED TO THE NON-COMPACTED TOTAL.

*Motsinger dump out of the city landfills. Bowers dumps outside the county, Stokes also.

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